Judge McMahon

11 CIV 5379

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

SOURCE VAGABOND SYSTEMS, LTD., Plaintiff, v. HYDRAPAK, INC., Defendant.	CIVIL ACTION NO. _____ JUDGE _____ **COMPLAINT FOR PATENT INFRINGEMENT AND FALSE PATENT MARKING** **DEMAND FOR JURY TRIAL**

Plaintiff Source Vagabond Systems, Ltd. ("Source Vagabond" or "Plaintiff"), for its Complaint of patent infringement and false patent marking against Defendant Hydrapak, Inc. ("Hydrapak" or "Defendant") does hereby assert and allege:

PARTIES

1. Plaintiff, Source Vagabond, is a company organized and existing under the laws of the State of Israel, having an address at 7 Hatnufa St., Tirat Hacarmel 30250 ISRAEL.

2. On information and belief, Defendant, Hydrapak, is a corporation organized and existing under the laws of the State of California, having a principal place of business at 6605 San Leandro Street, Oakland, California 94621.

JURISDICTION AND VENUE

3. This is an action for patent infringement arising under the laws of the United States, Title 35 of the United States Code, including 35 U.S.C. §§ 271 and 281-285, and also for false patent marking under 35 U.S.C. § 292. This Court has original jurisdiction over the subject matter of this claim pursuant to 28 U.S.C. §§ 1331 and 1338(a).

4. On information and belief, this Court has personal jurisdiction over Hydrapak, at least insofar as Hydrapak has established minimum contacts with the forum.

5. On information and belief, Hydrapak transacts and has transacted business, as that term is construed under N.Y. C.P.L.R. §§ 301 and 302(a)(1), in the State of New York, including in this judicial district.

6. On information and belief, Hydrapak sells, offers for sale, has sold, and/or has offered for sale, flexible water reservoirs for personal hydration systems in this judicial district, thereby constituting patent infringement under 35 U.S.C. § 271(a), and harming Source Vagabond.

7. On information and belief, Hydrapak sells, offers for sale, has sold, and/or has offered for sale, flexible water reservoirs in this judicial district, falsely marked with the notation "patent pending," thereby constituting false patent marking under 35 U.S.C. § 292.

8. Venue with respect to Hydrapak is proper in this district pursuant to 28 U.S.C. §§ 1391(b) and (c).

FACTS

Source Vagabond

9. Source Vagabond was established by Yoram Gill in 1991 out of a residential apartment.

10. Today, Source Vagabond has its own production facility in Israel, and employs over 200 people.

11. Source Vagabond's products are sold worldwide, including in the United States, and in this jurisdiction.

12. The Widepac™ water reservoir employs a pioneering design, in that the wide opening of the reservoir allows for easy filling, cleaning, and draining of the reservoir, relative to pre-existing water reservoirs that used screw-caps.

13. Source Vagabond's Widepac™ water reservoir for a personal hydration system was first sold commercially in 2001.

14. One of Source Vagabond's early buyers for its Widepac™ water reservoir was the United States Marine Corps, who began to purchase the product in 2004.

U.S. Patent No. 7,648,276

15. Source Vagabond is the owner by assignment of all right, title, and interest in and to United States Patent No. 7,648,276 ("the '276 patent"), entitled "Sealing Device for Flexible [Liquid] Container," issued by the United States Patent and Trademark Office on January 19, 2010. A copy of the '276 patent is attached hereto as **Exhibit A**.

16. Source Vagabond has owned the '276 patent throughout the period of Hydrapak's infringing acts, and still owns the '276 patent.

17. Source Vagabond's Widepac™ water reservoir is covered at least by claim 1 of the '276 patent.

Hydrapak's Patent Infringement

18. On information and belief, Hydrapak markets, produces, distributes, sells, imports into and/or offers to sell in the United States, including in this jurisdiction, flexible hydration packs, including at least Hydrapak's Reversible Reservoir II.

19. According to Hydrapak's marketing materials, "[t]he Reversible Reservoir II combines the easy cleaning, drying, and filling that defined the original [Reversible Reservoir water reservoir] with a new slide-seal closure that is easier, faster, and more intuitive." A copy of Hydrapak's marketing materials for its Reversible Reservoir II, taken from Hydrapak's Internet website (http://www.hydrapak.com) is attached hereto as **Exhibit B**.

20. Hydrapak's products, including at least Hydrapak's Reversible Reservoir II water reservoirs, infringe at least claim 1 of the '276 Patent, either literally, or under the doctrine of equivalents.

21. Upon information and belief, Hydrapak has been aware of the '276 patent since at least as early as October 25, 2006, while the '276 patent application was pending.

22. Source Vagabond has given Hydrapak written notice that Hydrapak is infringing the '276 Patent.

23. Hydrapak's infringement has caused and continues to cause harm to Source Vagabond.

Hydrapak's False Patent Pending Marking

24. Hydrapak has violated 35 U.S.C. § 292(a) by marking unpatented articles with the purpose of deceiving the public.

25. More specifically, Hydrapak has marked products, including at least the Reversible Reservoir II water reservoir, with language indicating that the products are the subject of one or more pending patent applications, when in fact, no patent application covering the products is pending.

26. The patent marking and false marking statutes exist to give the public notice of patent rights. Congress intended the public to rely on marking as a ready means of discerning the status of intellectual property embodied in an article of manufacture or design. Federal patent policy recognizes an important public interest in permitting full and free competition in the use of ideas which are, in reality, a part of the public domain.

27. False patent marking is a serious problem. Acts of false marking deter innovation and stifle competition in the marketplace.

28. False marking may mislead the public into believing that a purported patentee (or purported patent applicant) controls technology embodied in the article in question (as well as like articles).

29. Specifically, if an article is falsely marked, potential customers may be misled into purchasing the falsely marked product, believing that by purchasing a similar competing product, they may be liable for infringement, thereby stifling fair competition, and providing a company engaging in false marking an unfair advantage in commerce.

30. False marking may also create a misleading impression that the falsely marked product is technologically superior to previously available ones, as articles

bearing the term "patent" or "patent pending" may be presumed to be novel, useful, and innovative.

31. The false marking statute explicitly permits *qui tam* actions. By permitting members of the public to sue on behalf of the government, Congress allowed individuals to help control false marking.

32. Source Vagabond, on its own behalf and on behalf of the United States, seeks an award of monetary damages of not more than $500 for each of Hydrapak's violations of 35 U.S.C. § 292(a), one-half of which shall be paid to the United States pursuant to 35 U.S.C. § 292(b).

33. On information and belief, Hydrapak has, or regularly retains, sophisticated legal counsel, at least some of whom have knowledge regarding false patent marking.

34. Upon information and belief, Hydrapak has experience applying for patents, including filing patent applications published as U.S. Patent Publications No. 2007/0280565 and 2007/0280564, copies of which are attached to this Complaint as **Exhibits C** and **D**, respectively.

35. The application published as U.S. Patent Publication No. 2007/0280565 (the " '565 Application," **Exhibit C**) is purportedly directed to a refillable reservoir system for fluid transport and dispensing.

36. As of October 26, 2009, the '565 Application has been abandoned.

37. The application published as U.S. Patent Publication No. 2007/0280564 (the " '564 Application," **Exhibit D**) is purportedly directed to a reservoir closure system.

38. Claim 1 of the '564 Application, as originally filed, and other claims, were rejected as lacking novelty, based on Source Vagabond's pre-existing '267 Patent, and other prior art references.

39. The claims of the '564 Application were amended starting July 2009.

40. As currently pending, claim 1 of the '564 Application recites (emphasis added):

> A reservoir closure system comprising:
>
> a container wherein the container comprises a first end, the first end having a first lip, a first catch, a second lip, a second catch, a reservoir and an orifice at the first end having a closed configuration and an open configuration, and wherein the container is sufficiently flexible to be turned inside out, and wherein the reservoir is in fluid communication with the orifice, and wherein the orifice has an orifice closed length about the width of the first end of the container when the orifice is in the closed configuration;
>
> a sealing member configured to slidably attach to the container, and wherein the sealing member has a seal length, and wherein the seal length is at least substantially equal to the orifice closed length, and wherein the sealing mechanism is configured to seal the container, and wherein the sealing member has a substantially straight configuration;
>
> wherein the sealing member comprises a channel defined by a sealing member first side, a sealing member second side, a first upper arm and a first lower arm extending from the sealing member first side and positioned opposite a second upper arm and a second lower arm extending from the sealing member second side; and
>
> wherein the sealing member first side is rigidly integral with the sealing member second side; and
>
> wherein the sealing member has a sealing member longitudinal axis, a sealing member first end and a sealing member second end, and wherein the shape of the sealing member first end radially expands away from the sealing member longitudinal axis as the length along the sealing member first end approaches the terminus of the sealing member; and
>
> wherein the sealing member first side is at a fixed width away from the sealing member second side when the system is in a first configuration when the sealing member is separate from the container and when the

> system is in a second configuration when the sealing member is attached to the container and induces the sealing of the container; and
>
> wherein the channel is configured to receive the first and second catches of the container as the sealing member is slidably attached to the container ***such that the first and second upper arms compress the first and second lips above the received first and second catches***, the first and second lower arms compress the first and second lips below the received first and second catches to seal the container, and the first and second catches prevent substantial movement of the sealing member in a vertical direction relative to the container.

41. Upon information and belief, in Hydrapak's Reversible Reservoir II water reservoirs, the sealing member's first and second upper arms do not "compress the first and second lips above the received first and second catches."

42. Hydrapak has marked and/or continues to mark its products, including but not limited to Hydrapak's Reversible Reservoir II water reservoirs, with the phrase "Patent Pending," with the intent to imply, indicate, or suggest that the product is covered by pending patent claims, and/or is in the process of being patented.

43. The Reversible Reservoir II water reservoir is not covered by any of Hydrapak's pending patent applications, including without limitation the '565 and '564 Applications.

44. Upon information and belief, Hydrapak knew that that its pending patent applications, including without limitation the '565 and '564 Applications, do not cover the Reversible Reservoir II water reservoirs.

45. Alternatively, Hydrapak cannot have reasonably believed that its pending patent applications, including without limitation the '565 and '564 Applications, do not cover the Reversible Reservoir II water reservoirs.

46. Upon information and belief, Hydrapak intentionally marked its Reversible Reservoir II water reservoir with the phrase "Patent Pending" for the purpose

of deceiving the public, including potential customers, into believing that the Reversible Reservoir II water reservoir is covered or protected by a pending patent application.

47. Source Vagabond alleges the foregoing intent based on the rebuttable presumption (per the Federal Circuit's decision in *Pequinot v. Solo Cup*) that intent to deceive arises from the fact that Defendant had knowledge that it had marked its Reversible Reservoir II water reservoirs with the phrase "Patent Pending."

48. Each false marking on Hydrapak's Reversible Reservoir II water reservoirs is likely to, or at least has the potential to, discourage or deter persons and companies from purchasing competing products.

49. Hydrapak's false marking of its Reversible Reservoir II water reservoirs has wrongfully quelled competition with respect to such similar products, thereby causing harm to Source Vagabond, the United States, and the public.

COUNT I
PATENT INFRINGEMENT

50. Plaintiff repeats and re-alleges the allegations set forth in Paragraphs 1-49 of this Complaint, as though fully set forth herein.

51. Hydrapak has made, used, offered to sell, sold, and/or imports into the United States, and continues to make, use, offer to sell, sell, and/or import into the United States, products that practice the inventions of the '276 patent, including at least Hydrapak's Reversible Reservoir II water reservoir for hydration system.

52. Hydrapak has infringed and continues to infringe the '276 patent in violation of 35 U.S.C. § 271.

53. Hydrapak's infringement has occurred with knowledge of the '276 patent, and has been willful.

54. Hydrapak's acts of infringement have caused damage to Source Vagabond, and Source Vagabond is entitled to recover from Hydrapak the damages sustained by Source Vagabond as a result of Hydrapak's wrongful acts.

55. Hydrapak's acts of infringement will continue to damage Source Vagabond, causing irreparable harm, for which there is no adequate remedy at law, unless enjoined by the Court.

COUNT II
FALSE PATENT PENDING MARKING

56. Plaintiff repeats and re-alleges the allegations set forth in Paragraphs 1-55 of this Complaint, as though fully set forth herein.

57. Hydrapak falsely marked its Reversible Reservoir II water reservoirs with the marking "Patent Pending," when no application for patent covers Hydrapak's Reversible Reservoir II water reservoirs.

58. Hydrapak knew or reasonably should have known that marking its Reversible Reservoir II water reservoirs with the "Patent Pending" marking is in violation of 35 U.S.C. § 292.

59. Hydrapak intended to deceive the public by marking its Reversible Reservoir II water reservoirs with the "Patent Pending" marking.

60. Hydrapak's actions are in violation of 35 U.S.C. § 292.

JURY TRIAL DEMAND

61. Pursuant to Rule 38, Fed. R. Civ. P. Source Vagabond hereby demands a trial by jury on all issues set forth herein that a properly triable to a jury.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff, Source Vagabond, respectfully requests that the Court, upon final hearing of this matter, to grant the following relief and to enter judgment in favor of Source Vagabond as follows:

A. A judgment that Hydrapak has infringed the '276 patent;

B. An injunction permanently restraining and enjoining Hydrapak (and any of Hydrapak's officers, directors, employees, agents, servants, successors, assigns, and any and all persons in privity or in concert with Hydrapak, directly or indirectly) from infringing the '276 patent in any manner;

C. An award to Source Vagabond of damages adequate to compensate Source Vagabond for the infringement by Hydrapak, but in no event less than a reasonable royalty for the use made of the inventions of the '276 patent by Hydrapak, together with costs, and interest thereon;

D. A judgment that Hydrapak has willfully infringed the '276 patent and an award of treble damages;

E. A judgment that this case is exceptional and an award of reasonable attorney fees and costs to Source Vagabond pursuant to 35 U.S.C. § 285;

F. A judgment that Hydrapak has engaged in false patent marking pursuant to 35 U.S.C. § 292;

G. An injunction permanently restraining and enjoining Hydrapak (and any

of Hydrapak's officers, directors, employees, agents, servants, successors, assigns, and any and all persons in privity or in concert with Hydrapak, directly or indirectly) from violating 35 U.S.C. § 292;

H. An order requiring Hydrapak to pay a civil monetary fine of up to $500 per false marking "offense," one-half of which shall be paid to the United States and one-half of which shall be paid to Source Vagabond;

I. A judgment and order requiring Hydrapak to pay Source Vagabond prejudgment and post-judgment interest on the damages awarded;

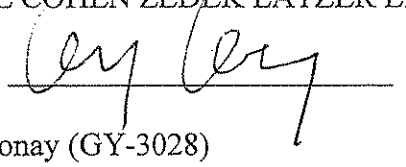
J. An order requiring Hydrapak to pay Source Vagabond's costs and attorney fees; and

K. Such other and further relief as the Court deems just and proper.

Dated: August 2, 2011

Respectfully submitted,

PEARL COHEN ZEDEK LATZER LLP

By: 

Guy Yonay (GY-3028)
GuyY@pczlaw.com

Clyde A. Shuman (CS-6351)
ClydeS@pczlaw.com

1500 Broadway, 12th Floor
New York, NY 10036
Tel: (646)878-0800
Fax: (646)878-0801

Attorneys for Plaintiff
Source Vagabond Systems Ltd.

US007648276B2

(12) **United States Patent**
Gill

(10) **Patent No.: US 7,648,276 B2**
(45) **Date of Patent: Jan. 19, 2010**

(54) **SEALING DEVICE FOR FLEXIBLE LIQUOR CONTAINER**

(75) Inventor: **Yoram Gill**, Haifa (IL)

(73) Assignee: **Source Vagabond Systems Ltd.**, Tirat Carmel (IL)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 719 days.

(21) Appl. No.: **09/989,334**

(22) Filed: **Nov. 20, 2001**

(65) **Prior Publication Data**

US 2002/0094140 A1 Jul. 18, 2002

(30) **Foreign Application Priority Data**

Nov. 21, 2000 (IL) 139801
Aug. 8, 2001 (IL) 144800

(51) **Int. Cl.**
B65D 33/16 (2006.01)

(52) **U.S. Cl.** **383/68**; 383/66; 383/908

(58) **Field of Classification Search** ..... 383/89, 383/25, 30, 31, 68, 90, 85, 88, 66, 904; 24/460, 24/461, 30.5 R, 30.5 L, 570; D9/435; 224/148.2
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

468,257	A *	2/1892	Paige	383/13
1,246,530	A *	11/1917	Bird	383/30
1,361,605	A *	12/1920	Morrill	383/69
2,601,568	A *	6/1952	Sussenbach et al.	383/69
3,141,221	A *	7/1964	Faulls, Jr.	24/30.5 R
3,266,711	A *	8/1966	Song	383/13
3,481,007	A *	12/1969	Scarritt, Jr.	24/30.5 L
3,939,533	A *	2/1976	Benepe	24/30.5 R
4,009,287	A *	2/1977	Clarke	426/106
4,040,562	A *	8/1977	Ward et al.	383/30
4,871,264	A *	10/1989	Robbins et al.	383/68
D331,364	S *	12/1992	Barker et al.	D9/434
D372,674	S *	8/1996	Weber et al.	D9/443
5,613,282	A *	3/1997	Deddens et al.	24/30.5 R
5,816,457	A	10/1998	Croft	
5,913,456	A	6/1999	Dikeman	
5,941,640	A	8/1999	Thatcher	
5,983,460	A *	11/1999	Hyde et al.	24/30.5 R
6,132,089	A *	10/2000	Galomb et al.	383/63
6,231,235	B1 *	5/2001	Galomb et al.	383/63
6,247,619	B1	6/2001	Gill et al.	

FOREIGN PATENT DOCUMENTS

FR	74516 *	12/1960	383/68
GB	2266701 *	11/1993	383/68
IT	544362 *	1/1958	383/25
IT	597773 *	9/1959	383/68
WO	WO 92/16424 A1 *	10/1992	

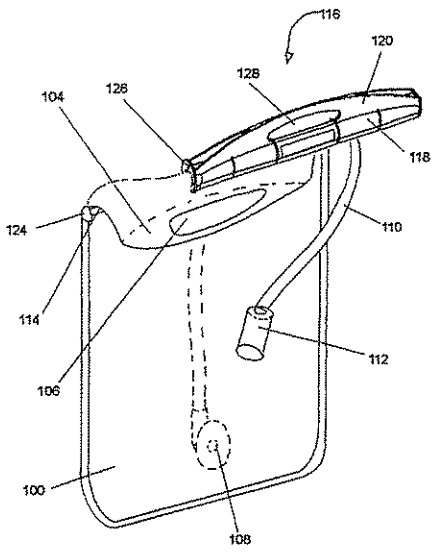
* cited by examiner

Primary Examiner—Robin Hylton
(74) *Attorney, Agent, or Firm*—Pearl Cohen Zedek Latzer, LLP

(57) **ABSTRACT**

Sealing device for flexible liquid container is disclosed. In one preferred embodiment of the invention, the sealing device comprises an elongated member with a hollow passage extending through it with a longitudinal slot, slidingly mountable over a rod, which is provided over a lateral opening of a flexible liquid container. In another preferred embodiment of the present invention the rod is attached to the member extending through the passage. When the portion of the container provided with the lateral opening is folded over the rod, substantially overlapping an adjacent portion of the container and the sealer is slidingly mounted over the folded portion of the container, liquid is prevented from leaking out of the container through the lateral opening.

5 Claims, 5 Drawing Sheets



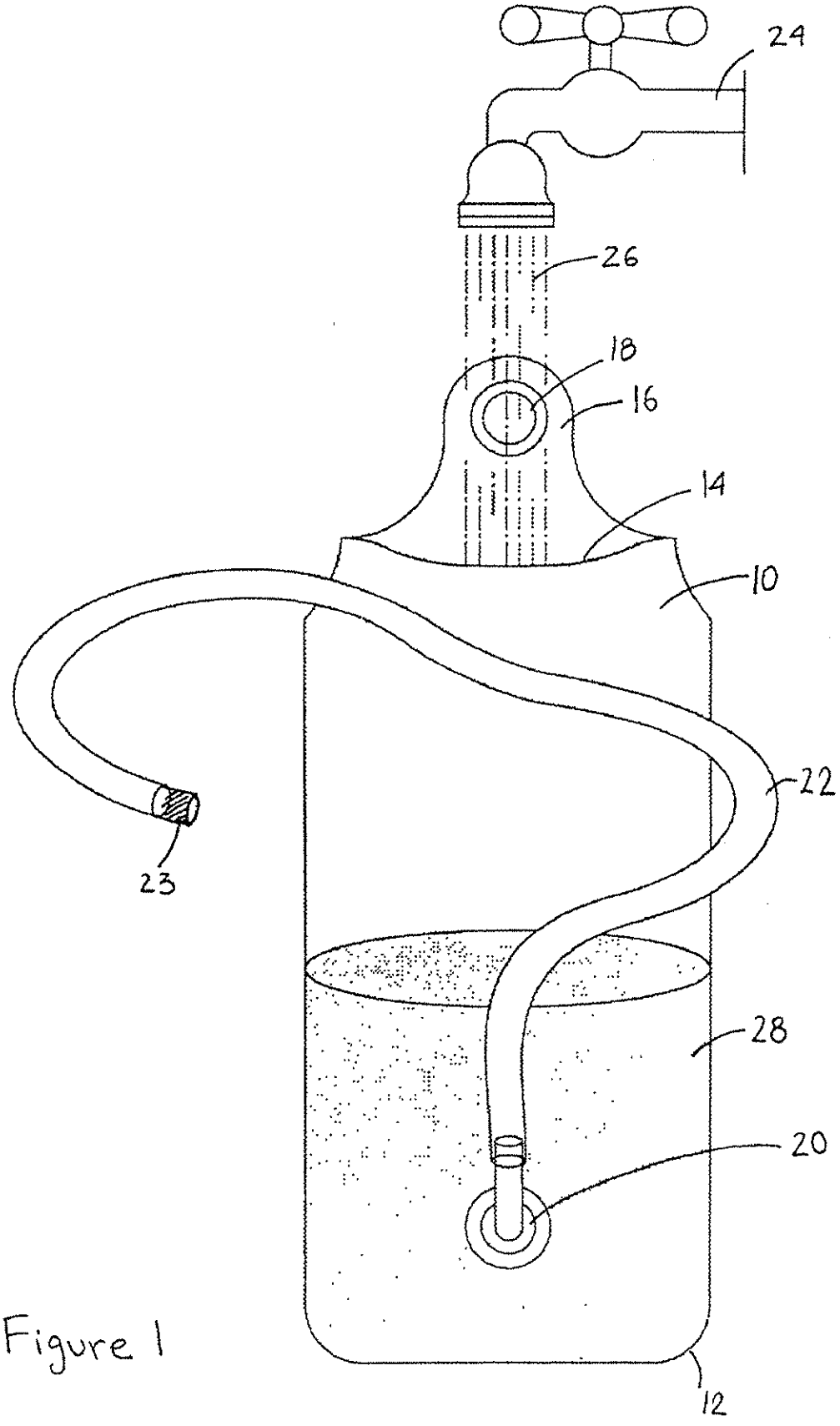
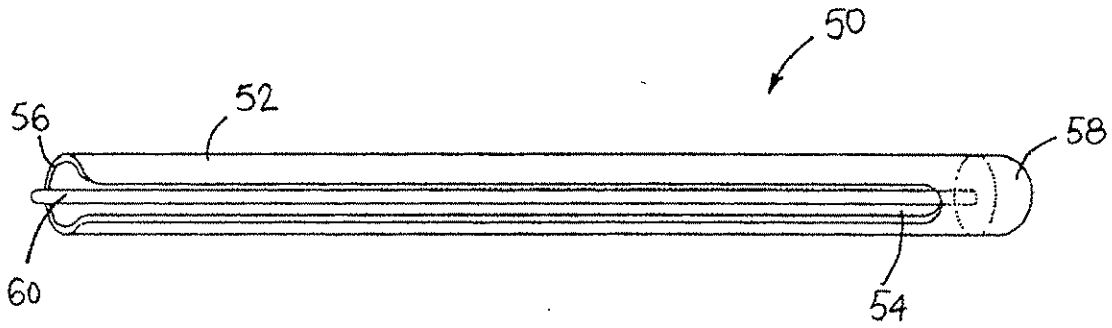


Figure 1

Figure 2



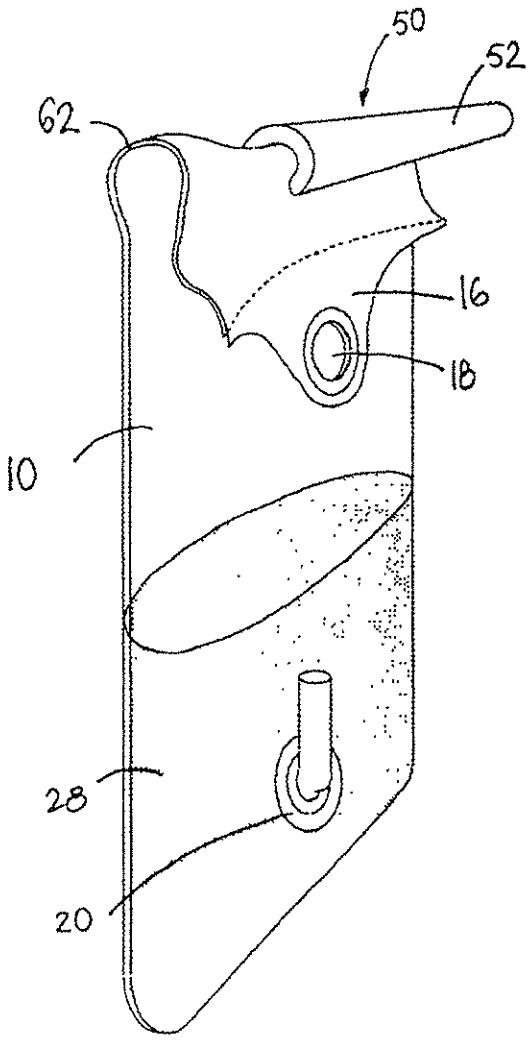


Figure 3A

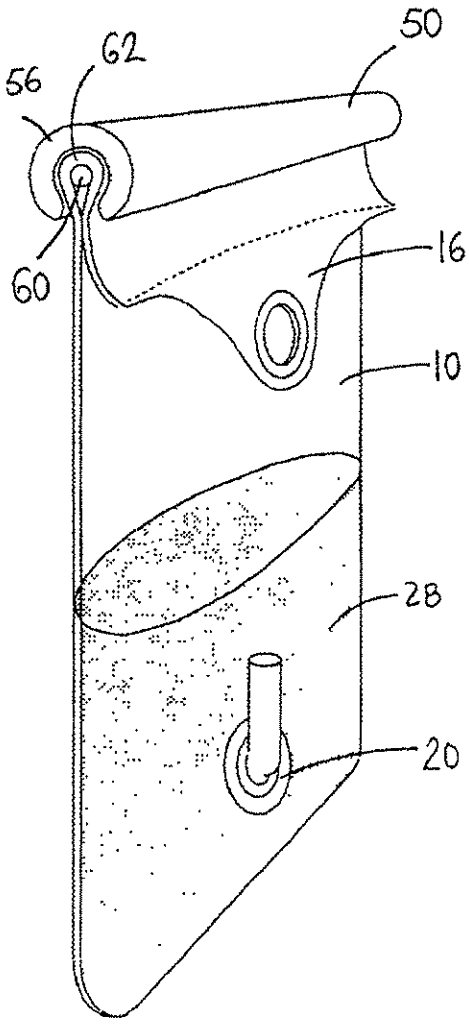


Figure 3B

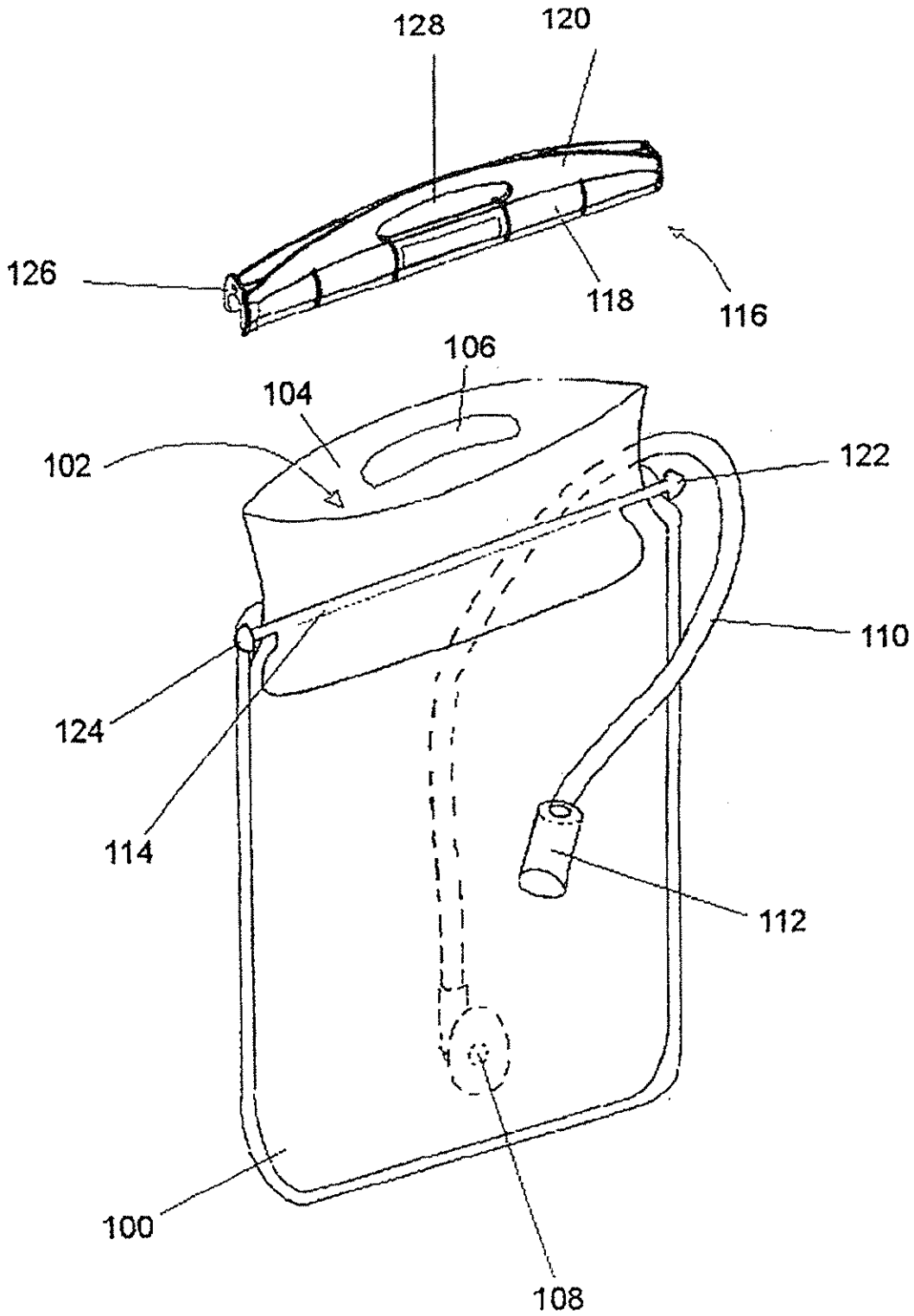


Figure 4

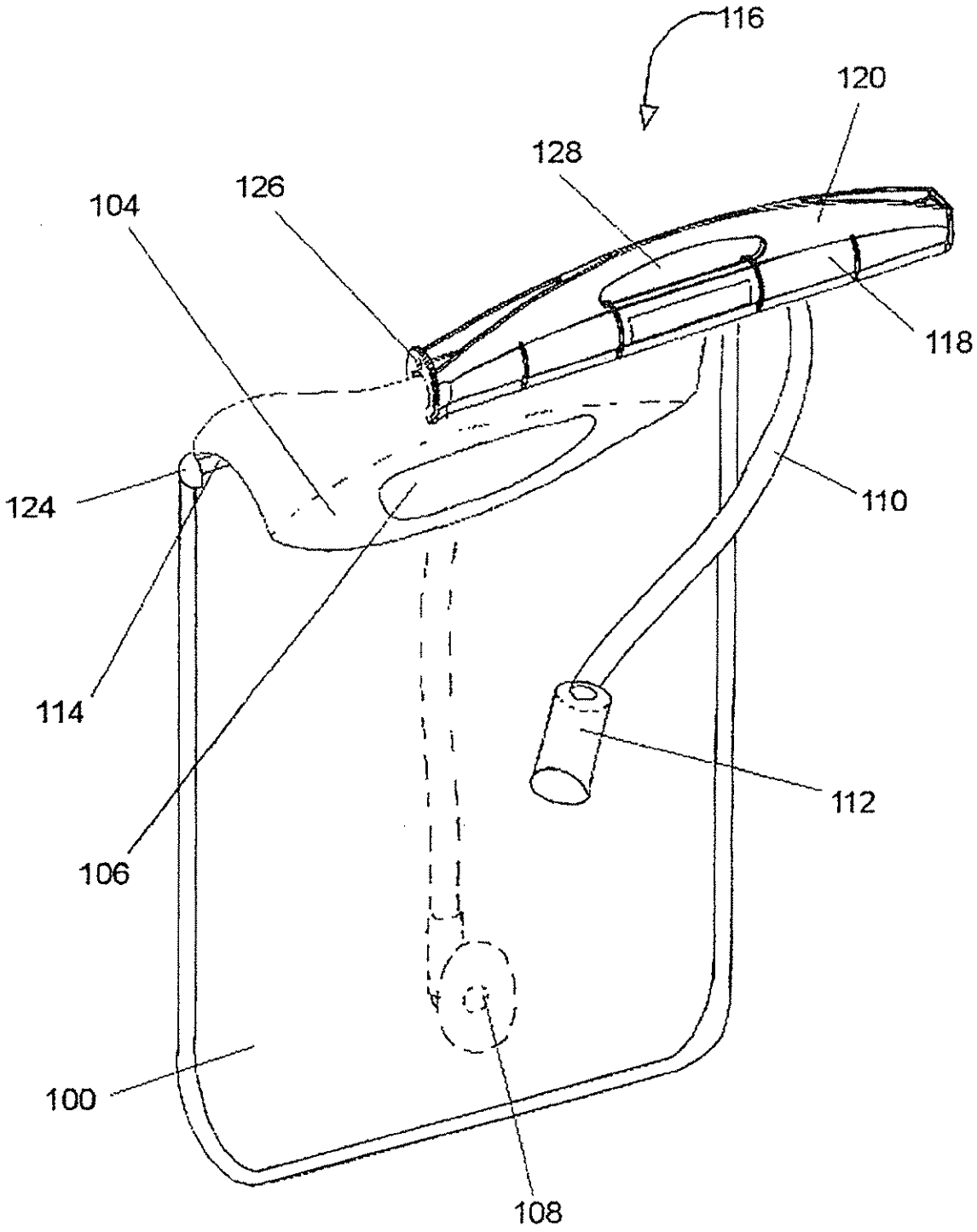


Figure 5

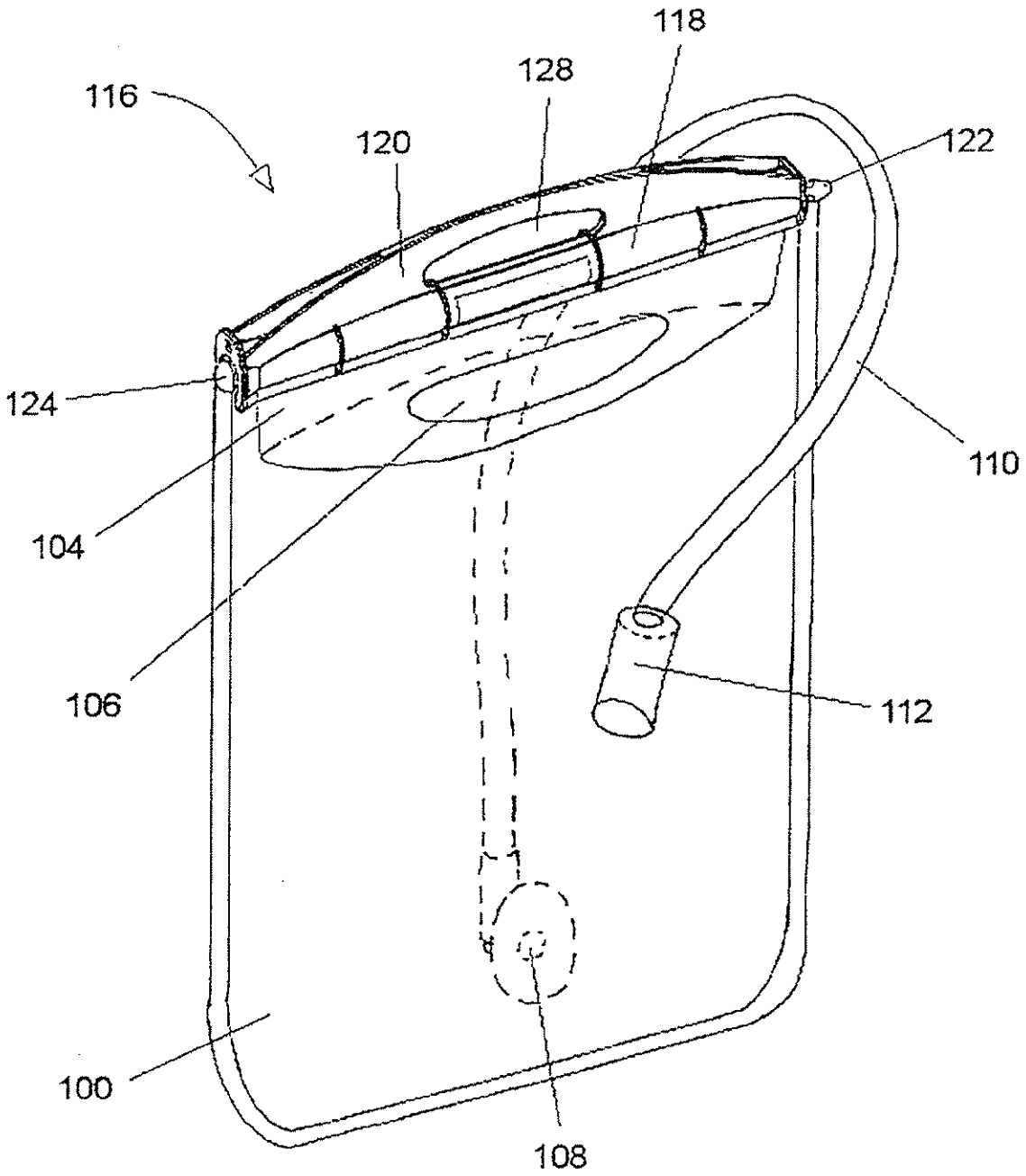


Figure 6

SEALING DEVICE FOR FLEXIBLE LIQUOR CONTAINER

FILED OF THE INVENTION

The present invention relates to liquid containers. More particularly, the present invention relates to a liquid container provided with a sealer that is adapted to close a wide opening in the container.

BACKGROUND OF THE INVENTION

Personal hydration systems are known in the art and are used extensively by people that are active in sports, trekking activities, recreational is activities as well as in the military. Over the last decade, people in general and especially people that are active in physical activities became aware of the fact that drinking during physical activity is crucial from health considerations. Therefore, personal hydration systems were developed over the years and since the use of soft polymers such as polyurethane became applicable in designing the drinking containers of the hydration systems, flexible containers, bladder-like containers, became widely used. An example for a personal hydration system is shown in U.S. Pat. No. 5,816,457 "hydration system" by Croft, filed in 1996. This patented hydration system for backpackers or other athletes includes a bladder, a filling opening, an enclosing cover and filling opening, a flexible line and a deformable valve to be held in the user's mouth. Another hydration system was invented by the inventor of the present invention (Gill Yoram) and Ezer Asaf and disclosed in PCT patent application no. PCT/IL97/00263 (filed in the U.S. Ser. No. 09/297,384) "Flexible Container for Storing and Dispensing Liquids". This flexible container comprises an inner bag and at least one outer bag, and liquid dispensing means.

One of the problems stemming from the use of flexible polymers in the design of hydration containers is that they are not easily cleaned. The soft polymer itself is a material that may absorb matter from the liquid, especially if the liquid filled in the container is juice or tea or other sugar containing liquid. In addition, the container is soft and has welded areas, therefore residues of the liquid that was inside the container may be left in corners formed in the sides of the container. Cleaning becomes a problem even when using the opening of the container from which the container is filled by liquid since this opening is usually relatively small. Accessories for cleaning flexible containers are available (can be purchased in the markets) but still, the maintenance of the container is difficult.

Most of the flexible containers are made from two flexible sheets of polymer welded together from all sides while an opening for filling the container and drinking from it is formed on the side of the container in the surface of one of the sheets. One of the solutions for the maintenance problem in those types of flexible containers is to leave a large opening on one of the sides of the container by leaving an unwelded area. It is straightforward that the unwelded area that acts as an opening is in the narrower side of the container while it becomes very easy to clean the interior of the container by inserting a hand into it. Moreover, it is easy to dry the container after cleaning is finished and there is no need for expensive cleaning and drying accessories.

Leaving an unwelded area to be used as an opening for cleaning the container brought about another problem. The ability to hermetically seal this opening when the container is in use and filled with liquid is diminished. Several solutions are available on the markets. Two of the solutions ("easy clean" from Blackburn company and another container from

ultimate direction company) are based on an extended opening that may be folded several times and possibly to different directions. The folds of "easy clean" may be secured by hook and loop fastenrs. The solution of ultimate direction is based on U.S. Pat. No. 5,941,640 "Roll Top Bladder" by Thatcher filed in 1997. This bladder includes two sidewall portions, which are disposed opposite one another and joined along a majority of the perimeter. In the unattached portion, a neck is formed, which extends from the body of the bladder. To close the conduit formed by the neck portion, the neck portion is rolled towards the body. The rolled neck portion seals the opening closed and prevents liquid from escaping out of the neck. Another solution is offered by cascade designs company. Here, their platypus flexible hydration system is closed by a "big zip". The closure is based on the idea of a plastic zipper in which one side of the opening is provided with a strip that protrudes from the sheet surface and opposite to the strip, a corresponding groove is provided. When the user wishes to close the container, he presses the strip into the groove so that the opening is closed. Another solution that is based on the idea of a ZIP-LOCK® is disclosed in U.S. Pat. No. 5,913,456 by Dileman "Pressurized Portable Drinking System" filed in 1997. This patent discloses a liquid dispenser that includes a container formed of a flexible synthetic resin material and a hose connected to the container for dispensing liquid. Among other features, the dispenser also includes a closure assembly that is positionable in a scaled position sealing a cavity shut beneath a mouth so that the cavity is substantially liquid tight, and an unscasled position exposing the cavity to the mouth for filling.

In all the available solutions including the above mentioned ones, the container is prone to liquid leakage. In all of these cases, the container has to be positioned so that the opening is in the upper side of the container at all times. This fact prevents the free use of the container to many of the application that these containers are designed for. For example, when the personal hydration system is placed on the rear of a bike, it is most convenient to put the container on its side. Placing a container having a cleaning opening closed in the way described herein above cause leakage and loses of liquid. Those containers may be used only when the container is hanged, a fact that limits the use of the personal hydration system. There is a need to provide an easy way to close the hydration container so that the container is completely sealed when in use. Moreover, when the container is safely sealed, it may be placed in any orientation without leakage. Another problem that originates from using a zip-like closure is that when the container is filled, the user has to squeeze the side edges of the container in order to open up the opening. This operation is uncomfortable.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a flexible personal hydration container provided with a sealer that hermetically closes a wide opening in the container.

It is yet another object of the present invention to provide a flexible personal container provided with a sealer that safely secures and closes an opening in the container so that liquid from the container would not leak even when the container is full and even if the container is positioned with the opening in its bottom.

Yet, it is another object of the present invention to provide a flexible personal container provided with a sealer that closes a relatively wide opening that is large enough so that the opening may be used in order to fill liquid into the container and clean the container.

It is a further object of the present invention to provide a container provided with a sealer that is durable in extensive out-door activity.

Further, it is another object of the present invention to provide a flexible hydration container provided with a sealer that is cheap and easy to use.

It is thus provided a sealing device adapted to seal a flexible liquid container having a cavity for receiving liquids, a lateral opening for filling the container with liquids, and a liquid dispensing outlet, said sealing device comprising:

a hollow cylinder having an open end and a closed end, said cylinder is provided with an elongated slot extended from the closed end to the open end, wherein said slot meets said open end;

a rod attached to said close end, positioned inside and substantially concentric to said hollow cylinder;

whereby when a portion of the container provided with the lateral opening is folded while substantially overlapping an adjacent portion of the container, and said hollow cylinder is slidingly mounted onto the folded portion of the container while said rod is threaded in the fold between the adjacent portions, liquid is prevented from leaking out of the container through the lateral opening.

Furthermore, in accordance with another preferred embodiment of the present invention, the length of said sealing device is at least as the length of the lateral opening.

Furthermore, in accordance with another preferred embodiment of the present invention, a cap closes said closed end.

Furthermore, in accordance with another preferred embodiment of the present invention, said rod is slightly protruding beyond said open end.

Furthermore, in accordance with another preferred embodiment of the present invention, said flexible container is formed from two films having the majority of their perimeter fused, allowing a portion of the perimeter unfused so as to acts as the opening.

Furthermore, in accordance with another preferred embodiment of the present invention, said slot is slightly wider than twice the cumulative thickness of said two films.

Furthermore, in accordance with another preferred embodiment of the present invention, the distance between the outer diameter of said rod and the inner diameter of said hollow cylinder is slightly larger than the cumulative thickness of said two films so that said two films may be freely threaded between said rod and said hollow cylinder and so that said two films are tightly contiguous.

Furthermore, in accordance with another preferred embodiment of the present invention, one of said two films has an extension that goes beyond the lateral opening.

Furthermore, in accordance with another preferred embodiment of the present invention, said extension is provided with a hole.

Furthermore, in accordance with another preferred embodiment of the present invention, said flexible container is made of a material selected from a group of materials such as polyethylene, PVC or polyurethane.

Furthermore, in accordance with another preferred embodiment of the present invention, said rod has a round cross section.

Furthermore, in accordance with another preferred embodiment of the present invention, said sealing device is made from a rigid polymer, said rigid polymer is selected from a group of materials such as ABS or acethal polypropylene.

Furthermore, in accordance with another preferred embodiment of the present invention, it is provided a sealing device adapted to seal a flexible liquid container having a cavity for receiving liquids, a lateral opening for filling the container with liquids, and a liquid dispensing outlet, said sealing device comprising:

a rod having a first end and a second end, provided laterally across the flexible container so that a portion of the container adjacent the lateral opening can be folded over the rod and substantially overlap an adjacent portion of the container; and

a sealer comprising an elongated member having two opposite sides along which a hollow passage is extended with a longitudinal slot, wherein the sealer is provided with an opening on at least one of the opposite sides, and wherein said sealer is slidingly mountable over said rod, wherein the space defined within the passage is not smaller than the total space occupied by the portion of the container provided with the lateral opening folded over the rod and the rod itself when inserted in the passage, and wherein the slot is not narrower than the total thickness of the folded portion of the container and the adjacent portion when inserted through the slot,

whereby when the portion of the container provided with the lateral opening is folded over the rod, substantially overlapping an adjacent portion of the container and the sealer is slidingly mounted over the folded portion of the container and the rod, liquid is prevented from leaking out of the container through the lateral opening.

Furthermore, in accordance with another preferred embodiment of the present invention, the length of said rod is slightly longer than a length defining the lateral opening of the container.

Furthermore, in accordance with another preferred embodiment of the present invention, the first end of the rod is provided with a resilient lateral protrusion and the second end of the rod is provided with a stopper having a diameter that is larger than a diameter of the passage of said sealer.

Furthermore, in accordance with another preferred embodiment of the present invention, said rod is welded to the flexible container.

Furthermore, in accordance with another preferred embodiment of the present invention, the flexible container is formed from two adjacent films of polymeric material having a majority of their perimeter welded, and wherein the lateral opening is a portion of the perimeter, which is not welded.

Furthermore, in accordance with another preferred embodiment of the present invention, said passage has a horse-shoe-like cross section, and wherein the cross-section is substantially constant along said elongated member.

Furthermore, in accordance with another preferred embodiment of the present invention, said rod has substantially elliptic cross section.

Furthermore, in accordance with another preferred embodiment of the present invention, said sealer is made from a rigid polymer, said rigid polymer selected from ABS and acetal polypropylene.

Furthermore, in accordance with yet another preferred embodiment f the present invention, it is provided a sealable flexible liquid container comprising:

a flexible liquid container having a cavity for receiving liquids, a lateral opening for filling the container with liquids and for cleaning the container, and a liquid dispensing outlet;

a rod having a first end and a second end, said rod is slightly longer than a length defining the lateral opening; and

a sealer comprising an elongated member having two opposite sides along which a hollow passage is extended with a longitudinal slot, wherein the sealer is provided

with an opening on at least one of the opposite sides, and wherein said sealer is slidingly mountable over said rod, wherein the space defined within the passage is not smaller than the total space occupied by a portion of the container provided with the lateral opening folded over the rod and substantially overlap an adjacent portion of the container, and the rod itself when inserted in the passage, and wherein the slot is not narrower than the total thickness of the folded portion of the container and the adjacent portion when inserted through the slot,

whereby when the portion of the container provided with the lateral opening is folded over the rod, substantially overlapping an adjacent portion of the container and the sealer is slidingly mounted over the folded portion of the container and the rod, liquid is prevented from leaking out of the container through the lateral opening.

Furthermore, in accordance with another preferred embodiment of the present invention, said rod is provided laterally across the flexible container.

Furthermore, in accordance with another preferred embodiment of the present invention, said rod is welded to the flexible container.

Furthermore, in accordance with another preferred embodiment of the present invention, the first end of the rod is provided with a resilient lateral protrusion and the second end of the rod is provided with a stopper having a diameter that is larger than a diameter of the passage of said sealer.

Furthermore, in accordance with another preferred embodiment of the present invention, said rod is provided inside and substantially concentric to said elongated member and is attached to a side of the opposite sides of said elongated member that is closed.

Furthermore, in accordance with another preferred embodiment of the present invention, said rod is slightly protruding out from the opening that is opposite the closed side of said elongated member.

Furthermore, in accordance with another preferred embodiment of the present invention, the flexible container is formed from two adjacent films of polymeric material having a majority of their perimeter welded, and wherein the lateral opening is a portion of the perimeter that is not welded.

Furthermore, in accordance with another preferred embodiment of the present invention, said passage has a horse-shoe-like cross-section, and wherein the cross-section is substantially constant along said elongated member and wherein said rod has substantially elliptic cross section.

Furthermore, in accordance with another preferred embodiment of the present invention, said sealer is made from a rigid polymer, said rigid polymer selected from ABS and acetal polypropylene.

And furthermore, in accordance with another preferred embodiment of the present invention, said flexible container is made of a material selected from a group of materials such as polyethylene, PVC or polyurethane.

BRIEF DESCRIPTION OF THE FIGURES

FIG. **1** illustrates a view of a personal hydration system being filled with water through an opening in accordance with a preferred embodiment of the present invention.

FIG. **2** illustrates an isometric view of a sealer for personal hydration systems in accordance with a preferred embodiment of the present invention.

FIG. **3A** illustrates the sealer shown in FIG. **2** and the personal hydration system shown in FIG. **1** during the closing course of the hydration system.

FIG. **3B** illustrates the personal hydration system shown in FIG. **1**, fully closed by the sealer for hydration system shown in FIG. **2**.

FIG. **4** illustrates an isometric view of a personal hydration system provided with a sealer in accordance with a preferred embodiment of the present invention, in an open state.

FIG. **5** illustrates an isometric view of the personal hydration system provided with a sealer shown in FIG. **1**, partially closed.

FIG. **6** illustrates an isometric view of the personal hydration system provided with a sealer shown in FIG. **4**, fully sealed.

DETAILED DESCRIPTION OF THE INVENTION AND THE FIGURES

The unique seal of the present invention is adapted to hermetically seal personal hydration containers having an opening that is relatively large so as to enable easy filling and easy cleaning of the container through the opening. The seal prevents leakage of liquid from the container, no matter what the orientation of the container is. Therefore, the container may be positioned in any orientation as well as on its side without leakage.

Reference is now made to FIG. **1** illustrating a view of a personal hydration system being filled with water through an opening in accordance with a preferred embodiment of the present invention. The container **10** is a flexible and flat container that is made from a polymeric material such as polyurethane, PVC, or polyethylene. Container **10** is made from two films of polymeric material that are welded together at three sides **12** of the container, near its perimeter. The fusion is performed by conventional methods such as ultrasonic high frequency or heat. The welded sides of the films form a cavity that is adapted to receive liquid. At one of the narrower sides of container **10**, the perimeter is not welded so that an opening **14** is formed. One of the polymeric films has an extension **16** that facilitates in the opening of opening **14** when the container is filled since the two films forming the container are adjacent to each other. Extension **16** provides also a griping portion for handling the container. A hole **18** is provided in extension **16**. Hole **18** may be used in order to suspend container **10** when it is stored or when the container is being cleaned or dried.

Container **10** is provided with a liquid dispensing opening **20** in one side, close to the bottom of the container. Liquid dispensing opening **20** is designated to be connected to a flexible drinking pipe **22**. At the proximal side of drinking pipe **22**, a drinking valve **23** is provided. In order to fill container **10** with liquid such as water, opening **14** is oriented at the top of the container and freely opened. Container **10** is suspended with opening **14** wide open so that water **26** coming out from water tap **24** is directed to fill container **10**. Water **28** that is filled in container **10** may be drunk from container **10** through flexible drinking pipe **22** and drinking valve **23**.

Opening **14** is a large opening relative to the openings that are usually available in such containers so that the container may be filled conveniently (as shown in FIG. **1**). Moreover, ice cubes or any other solids or herbs may be inserted also very easily through opening **14**. But, when the container is to be cleaned, the advantages of opening **14** are the most significant. A hand with a cleaning cloth may be easily inserted into the container so that there is no need in special cleaning accessories. Moreover, the opening does not have any folds or welded cup's screw so that leftovers from the liquid can not be trapped in the folds and the cleaning is optimal.

After water fills container **10** and it is ready to be used, opening **14** has to be hermetically closed. Reference is now made to FIG. **2**, illustrating an isometric view of a sealer for personal hydration systems in accordance with a preferred embodiment of the present invention. Sealer **50** comprises a hollow cylinder **52**. Cylinder **52** has two ends, the first end is an open end **56** and the second end is closed, preferably by a cap **58**. An elongated slot **54** is carved along the side of cylinder **52**, slot **54** meets open end **56**. In the zone where the slot meets the open end of the cylinder, a broadening of the slot is provided so that the threading of the container into the slot is easier. A concentric and elongated rod **60** is attached substantially at the center of cap **58** and protrudes slightly through open end **56**. Sealer **50** is preferably made from a rigid polymeric material such as acethal polypropylene or ABS.

Reference is now made to FIG. **3**A illustrating the sealer shown in FIG. **2** and the personal hydration system shown in FIG. **1** during the closing course of the hydration system. Container **10** is folded in a way that extension **16** is wrapped over opening **14** and a fold **62** is formed. Opening **14** is fully on one side of the fold while the liquid receiving cavity is fully on the other side of the fold. Fold **62** is threaded into cylinder **52** of sealer **50** so that fold **60** is between the cylinder and rod **60**. In order to establish this position, open end **56** of sealer **50** is positioned so that it wraps one side of fold **62**, the rod is positioned in the interior of the fold and sealer **50** slidably proceeded towards the other side of the fold. The reason rod **60** protrudes from hollow cylinder **52** is to ease the insertion of the fold between the rod and the cylinder. The extended rod acts as a guide when the fold is threaded inside the cylinder and makes the insertion of the cylinder and the rod onto the fold of the container easier. Sealer **50** can not be removed from the fold unless it slides in an opposite direction to the direction it has been put on since slot **54** is narrower than the diameter of rod **60**. FIG. **3**A shows sealer **50** half way put onto fold **62**.

Reference is now made to FIG. **3**B illustrating the personal hydration system shown in FIG. **1**, fully closed by the sealer for hydration system shown in FIG. **2**. Sealer **50** is fully slided onto fold **62** until cap **58** that acts also as a stopper collides into fold **62** and can not proceed. The length of sealer **50** is preferably the same or slightly longer than the length of container in the direction it is folded so that rod **60** slightly protrudes from cylinder **52** and the container's side. When sealer **50** is fully inserted and closes container **10**, water **28** from the container can not leak even if the container is oriented up side down, so that the fold is in the bottom of the container.

The container is hermetically sealable if the slot in the hollow cylinder is slightly wider than twice the thickness of the container (the thickness of the container means the accumulative thickness of the two films that form the container). The thickness of the slot has to be optimized so that from one side it will be wide enough so that the folded container may be freely slided through the slot and from the other side, it has to be narrow enough so that water can not pass through the fold. In the same manner, the diameter of the elongated rod has to be adjusted so that the folded container may be freely inserted into the hollow cylinder between the cylinder and the rod. The two films in the fold that are situated between the hollow cylinder and the rod and inside the slot of the cylinder have to be tightly contiguous in order to establish a good sealing characteristic of the sealer. An example for optimized sizes of a container and a corresponding sealer are: for a container having thickness of approximately 0.9 mm (the thickness of the two films), a sealer having a slot of about 3 mm, a rod of about 3 mm in diameter and an inner cylinder diameter of about 11.5 mm will adapt to sealingly block the passage of liquid from the liquid receiving cavity through the fold while at the same time the insertion of the fold into the cylinder is easy.

Reference is now made to FIG. **4** illustrating an isometric view of a personal hydration system provided with a sealer in accordance with a preferred embodiment of the present invention, in an open state. A flexible container **100** is a flat container that is made from a polymeric material such as polyurethane, PVC, or polyethylene. Container **100** is made from two films of polymeric material that are welded together at three sides of the container, near its perimeter. The fusion is performed by conventional methods such as ultrasonic high frequency or heat. The welded sides of the films form a cavity that is adapted to receive liquids. At one of the narrower sides of container **100**, the perimeter is not welded so that an opening **102** is formed. Opening **102** is a large opening relative to the openings that are usually available in such containers so that the container may be filled conveniently and the user may clean the container by inserting his hand palm into the container. One of the polymeric films has an extension **104** that enables the user to handle the container while filling it or while cleaning it. Extension **104** provides also a griping portion for the container, therefore, a hole **106** is provided in extension **104**. Hole **106** may be used in order to suspend container **100** when it is stored or when the container is being cleaned or dried.

Container **100** is provided with a liquid dispensing opening **108** in one side, close to the bottom of the container. Liquid dispensing opening **108** is connected to a flexible drinking pipe **110**. At the proximal side of drinking pipe **110**, a drinking valve **112** is provided.

Substantially parallel and close to opening **102**, an elongated rod **114** is provided. Elongated rod **114** is preferably made of a relatively flexible yet rigid enough polymeric material that is laterally attached to container **100** and preferably welded to it. A separated sealer **116** is provided. Sealer **116** comprises an elongated member **118** having substantially horse-shoe-shaped cross-section and is adapted to internally accommodate rod **114**. Rod **114** can be inserted or pulled out from the interior of elongated member **118** only by sliding the rod through the side openings of the internal cavity in elongated member **118**. The rod's diameter is too large so as to be pulled out through the slot along the internal cavity of the elongated member. Sealer **116** further comprises a handle **120** that is design so as to enable the user to comfortably deal with the sealer. Handle **120** facilitates the user to hold the sealer and slide elongated member **118** onto rod **114**. Sealer **116** is preferably made of a rigid polymeric material such as acetal polypropylene or ABS.

In order to seal container **100**, extension **104** is wrapped over rod **114** and elongated member **118** is slidingly mounted over rod **114** and the wrap. As mentioned herein before, elongated member **118** is mounted over the rod by sliding the rod and wrap into the cavity of elongated member **118** from one of it sides. Rod **114** has two ends, the first end is provided with a lateral protrusion **122** and the second end is provided with a stopper **124**. In order to slidingly mount elongated member **118** onto rod **114**, lateral protrusion **122** is threaded into the interior of elongated member **118** through an opening **126** in the member. Elongated member **118** can be mounted on rod **114** only through the end provided with lateral protrusion **122**. Lateral protrusion **122** may be inserted through opening **126** while stopper **124**, on the other end of rod **114**, can not be inserted through opening **126**. In a preferred embodiment of the present invention the space defined within

the passage in the sealer is not smaller than the total space occupied by the portion of the container provided with the lateral opening folded over the rod and the rod itself when inserted in the passage, and the slot is not narrower than the total thickness of the folded portion of the container and the adjacent portion when inserted through the slot.

Reference is now made to FIG. **5**, illustrating an isometric view of the personal hydration system provided with a sealer shown in FIG. **4**, partially closed. After extension **104** is folded over rod **114**, opening **126** of elongated member **118** is mounted onto lateral protrusion **122** and elongated member **118** is slid onto rod **114**. Opening **126** is provided with a broadening in the part where the fold passes through so that the threading of the rod and the fold through elongated member **118** is made easier.

Reference is now made to FIG. **6** illustrating an isometric view of the personal hydration system provided with a sealer shown in FIG. **4**, fully sealed. Sealer **116** is fully sliding onto rod **114** (can not be seen in FIG. **6**, fully inserted in elongated member **118**). Stopper **124** stops sealer **116** from proceeding outwardly from rod **114**. In the fully sealed state, sealer **116** is restrained in the position shown in the figure since from one side, stopper **124** restrain it and from the other side, lateral protrusion **122** prevents sealer **116** from sliding back through it. When Container **100** is to be opened, lateral protrusion **122** has to be laterally pushed in order to enable the protrusion to pass through opening **126**. Therefore, the length of sealer **116** is slightly less than the length of rod **114** but it is designated so that end **126** is adjacent to stopper **124** while the second opening of elongated member **118** is adjacent to lateral protrusion **122**. In this way, the sealer completely seals the container.

It is preferable to design elongated rod **114** so that its cross section will be elliptic rather than circular and will be positioned with the ellipse elongated diameter parallel to the plane of the polymeric film. In this way, the rod is positioned in the interior of elongated member **118** so as to establish a complete and hermetic closure of container **100**.

Handle **120** is provided with a hole **128**. When sealer **116** seals container **100**, hole **128** may be used in order to suspend the container.

The container is hermetically sealable if the slot through which the fold pass is slightly wider than twice the thickness of the container (the thickness of the container means the accumulative thickness of the two films that form the container). The thickness of the slot has to be optimized so that from one side it will be wide enough so that the folded container may be freely slided through the slot and from the other side, it has to be narrow enough so that water can not pass through the fold. In the same manner, the diameter of the elongated rod has to be adjusted so that the folded container may be freely inserted into the gap between the elongated member and the rod. The two films in the fold that are situated in the gap have to be tightly contiguous in order to establish a good sealing characteristic of the sealer. An example for optimized sizes of a container and a corresponding sealer are: for a container having thickness of approximately 0.9 mm (the thickness of the two films), a sealer having a slot of about 3 mm, a rod of about 3 mm in diameter and an inner passage diameter of about 11.5 mm will adapt to sealingly block the passage of liquid from the liquid receiving cavity through the fold while at the same time the insertion of the fold into the cylinder is easy.

It should be clear that the description of the embodiments and attached Figures set forth in this specification serves only for a better understanding of the invention, without limiting its scope as covered by the following Claims.

It should also be clear that a person in the art, after reading the present specification could make adjustments or amendments to the attached Figures and above described embodiments that would still be covered by the following Claims.

The invention claimed is:

1. A sealable flexible liquid container system comprising:

a flexible liquid container having a cavity for receiving liquids, said cavity formed of two films having the majority of their perimeter fused, and a portion of the perimeter unfused so as to present a lateral opening for filling the container with liquids, and a liquid dispensing outlet;

a rod having a first end and a second end, fixedly attached to the container laterally across the lateral opening of the flexible container so that a portion of the container adjacent the lateral opening can be folded over the rod and substantially overlap an adjacent portion of the container; and

a sealer comprising an elongated rigid member having two opposite sides along which a hollow cavity is extended with a longitudinal slot wherein said slot is adapted to accommodate said two films, wherein the sealer is provided with an opening on at least one of the opposite sides with a broadening for inserting an end of the rod into the cavity when the portion of the container is folded over the rod into the hollow passage, the slot being narrower than the diameter of the rod, so that the sealer is only to be slidingly mounted sideways over the rod.

2. The system as claimed in claim **1**, wherein the length of said rod is slightly longer than a length defining the lateral opening of the container.

3. The system as claimed in claim **1**, wherein an end of the rod is provided with a stopper having a diameter that is larger than a diameter of the cavity of said sealer.

4. The system as claimed in claim **1**, wherein said rod is welded to the flexible container.

5. The system as claimed in claim **1**, wherein said sealer is made from a rigid polymer.

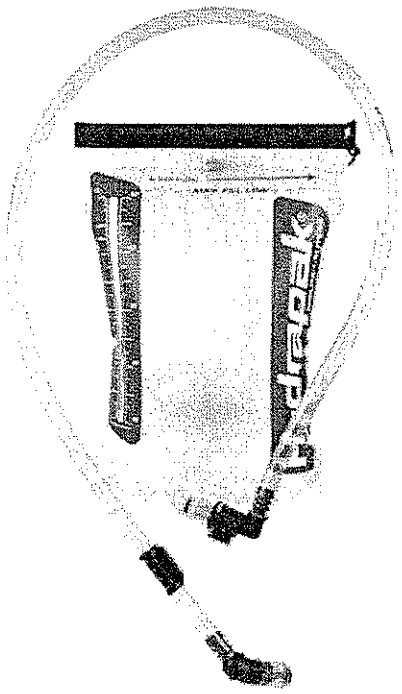
* * * * *

HOME PRODUCTS MILITARY OE PARTNERS ATHLETES BLOG

Search

Reversible Reservoir II

Category: Store > RESERVOIRS



SKU A20

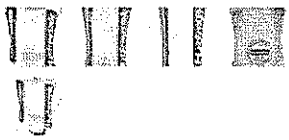
In stock

$27.99

Size

- (•) 50 oz.
- ( ) 70 oz. (+$1.00)
- ( ) 100 oz. (+$2.00)

Qty 1



View detailed images (5)

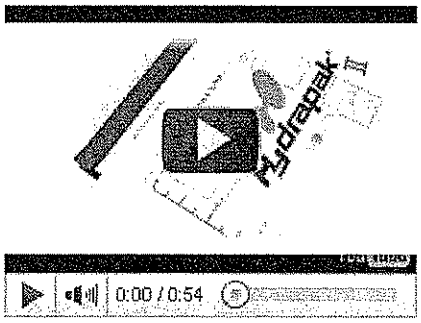
THE ORIGINAL HYDRAPAK REVERSIBLE RESERVOIR WAS A REVOLUTIONARY IMPROVEMENT OVER ORDINARY SCREW CAP SYSTEMS. NOW, WE'VE REINVENTED THE REVOLUTION. THE REVERSIBLE RESERVOIR II (RRII) COMBINES THE EASY CLEANING, DRYING, AND FILLING THAT DEFINED THE ORIGINAL WITH A NEW SLIDE-SEAL CLOSURE THAT IS EASIER, FASTER, AND MORE INTUITIVE. WE ALSO NOW HAVE A SINGLE SEAM WELD THAT MAKES THE RRII EVEN STRONGER. WE'VE TAKEN THE BEST TO A NEW LEVEL.

Reviews:

Grams Light Bikes, Bike Fix

Features:

- Video: Filling, Loading, and Cleaning Reservoir
- Video: Material Safety
- Video: Radio Frequency Welding vs Heat Welding
- Video: Evolution of the Reversible Reservoir II
- Video: Drink Tube Material
- Video: Surge Bite Valve
- Video: The Clean Reservoir
- Video: Reservoir Testing - Short
- Video: Reservoir Testing - Feature Length
- Animation: How Reservoir Integrates with Pack
- Fun at Interbike: Blasting Station Display



Sizes & Dimensions:

- 50 oz. (1.5 Liter): 6 ¾" x 11 ½"
- 70 oz. (2 Liter): 6 ¾" x 12 ¼"
- 100 oz. (3 Liter): 6 ¾" x 16 ½"
- Slider Width: 6 ¾"

Accessory System Includes:

- Reversible Reservoir II
- 36" Big Bore Tubing
- Surge Bite Valve
- Quantum Clip
- Plug-N-Play Connector

PVC Free

Our entire drink system is PVC Free from the reservoir, connectors, and drink tube. Some manufacturers still use PVC in their Drink Tubes because it is an inexpensive way to make the tubes flexible. This goes against our grain of making a healthier product.

US 20070280565A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2007/0280565 A1**

(43) **Pub. Date: Dec. 6, 2007**

Lyon et al.

(54) **RESERVOIR SYSTEM AND METHOD**

(75) Inventors: **Matthew J. Lyon**, Moraga, CA (US); **Samuel M. Lopez**, San Francisco, CA (US); **Robert H. J. Miros**, San Anselmo, CA (US)

Correspondence Address:
LEVINE BAGADE HAN LLP
2483 EAST BAYSHORE ROAD, SUITE 100
PALO ALTO, CA 94303

(73) Assignee: **HYDRAPAK, INC.**, Emeryville, CA (US)

(21) Appl. No.: **11/445,771**

(22) Filed: **Jun. 2, 2006**

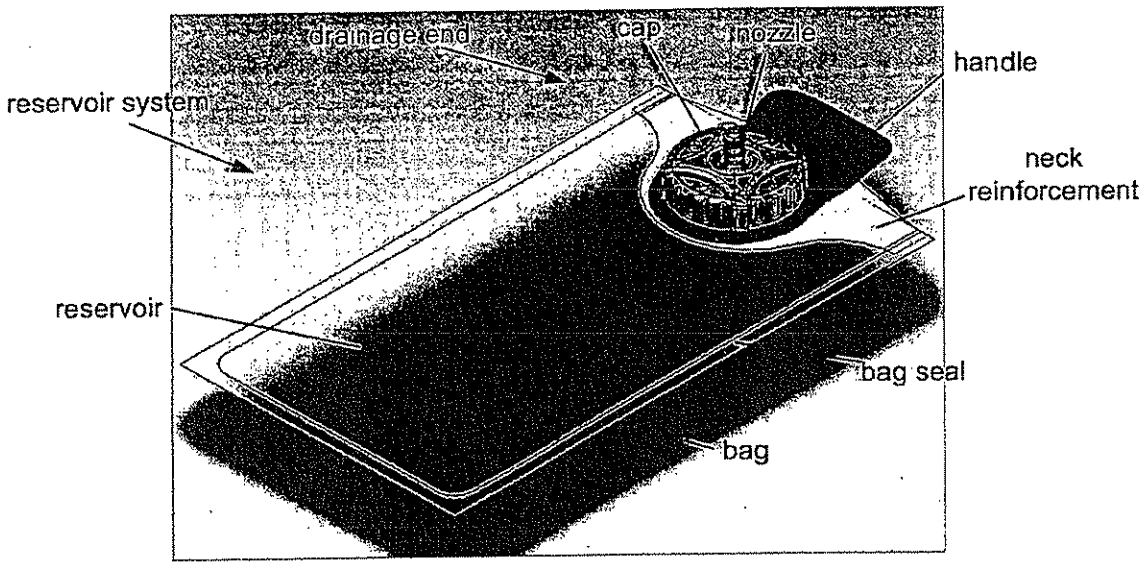
Publication Classification

(51) **Int. Cl.**
B65D 33/16 (2006.01)
B65D 33/06 (2006.01)
B65D 33/02 (2006.01)

(52) **U.S. Cl.** **383/80**; 383/906; 383/66; 383/119; 383/25

(57) **ABSTRACT**

A reservoir system for preserving the chemical stability and, therefore, the flavor of fluids is disclosed. The reservoir system can include a bag having a lining around a reservoir. The reservoir can have a reservoir port. The reservoir system can have a screw cap with a port for receiving a nozzle. The screw cap can be attached to the reservoir port. The nozzle can sealably attach to the cap. The nozzle can also sealably attach to a hose. The reservoir port and reservoir can be configured to maximize drainage of the reservoir, for example when the reservoir is turned reservoir port-side-down.



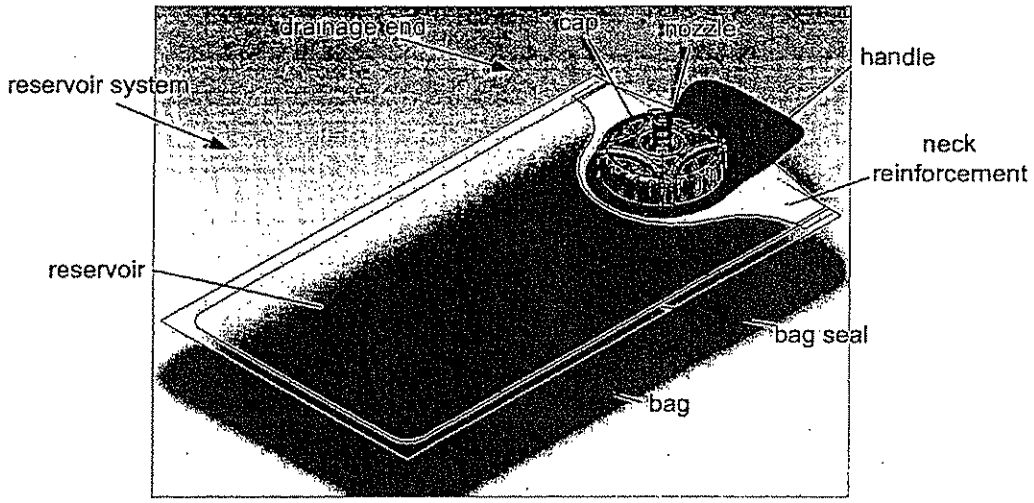

drainage end
cap
nozzle
handle
reservoir system
neck
reinforcement
reservoir
bag seal
bag

Fig. 1

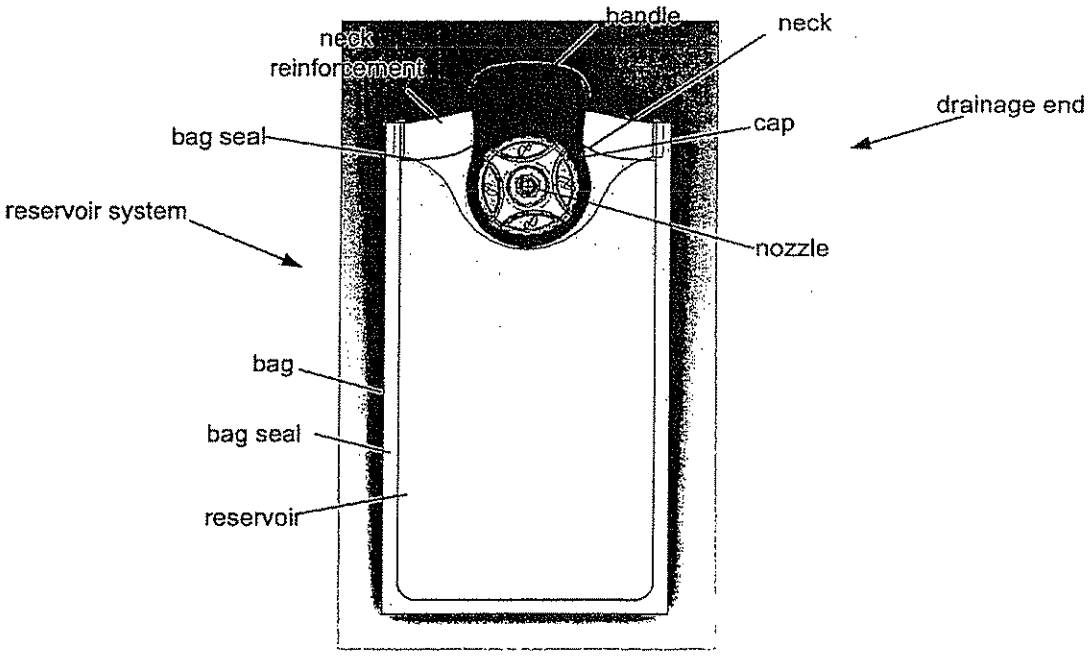

handle
neck
neck
reinforcement
drainage end
cap
bag seal
reservoir system
nozzle
bag
bag seal
reservoir

Fig. 2

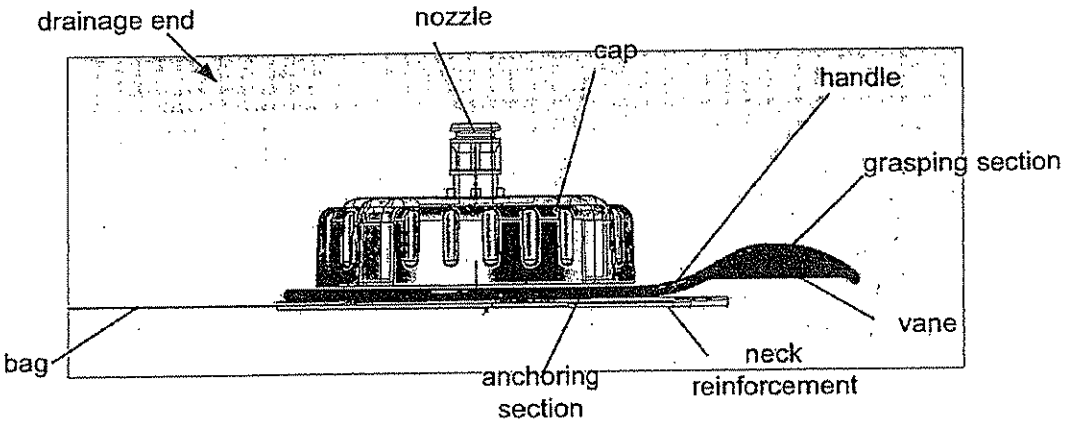

drainage end
nozzle
cap
handle
grasping section
vane
bag
anchoring section
neck reinforcement

Fig. 3

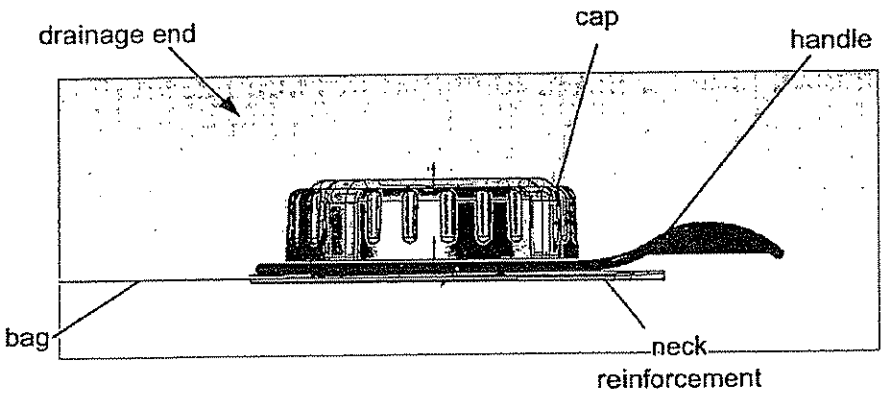

drainage end
cap
handle
bag
neck reinforcement

Fig. 4

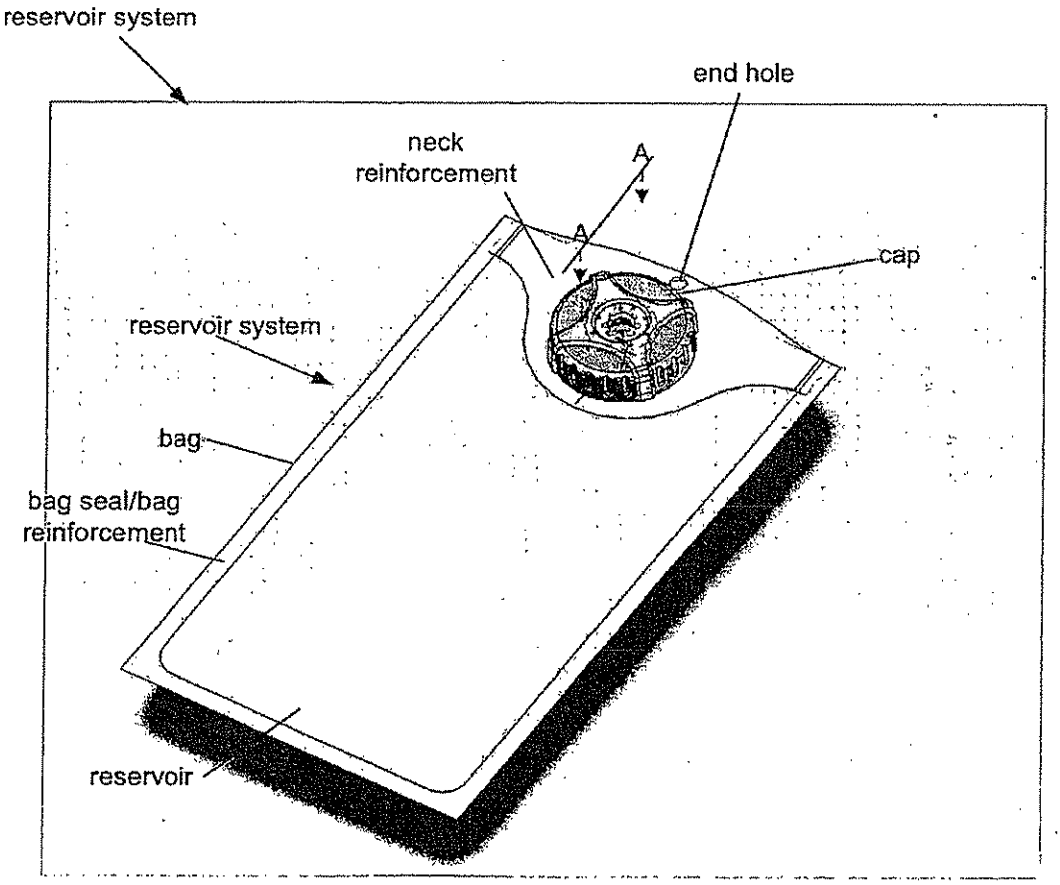

reservoir system
end hole
neck
reinforcement
A
A
cap
reservoir system
bag
bag seal/bag
reinforcement
reservoir

Fig. 5

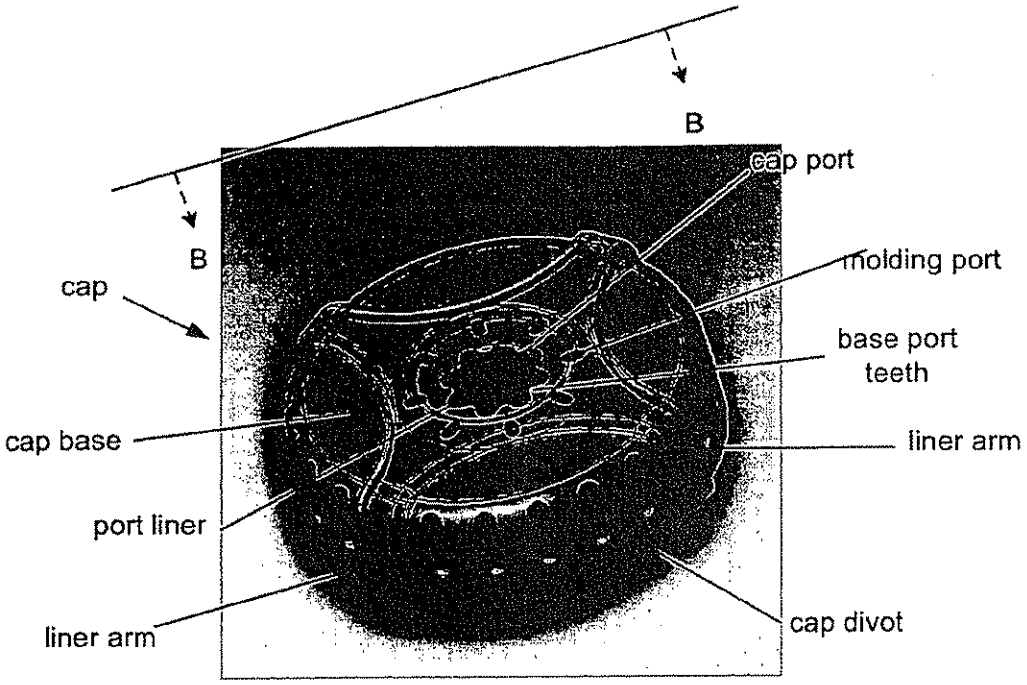

B
B
cap port
molding port
cap
base port
teeth
cap base
liner arm
port liner
liner arm
cap divot

Fig. 6

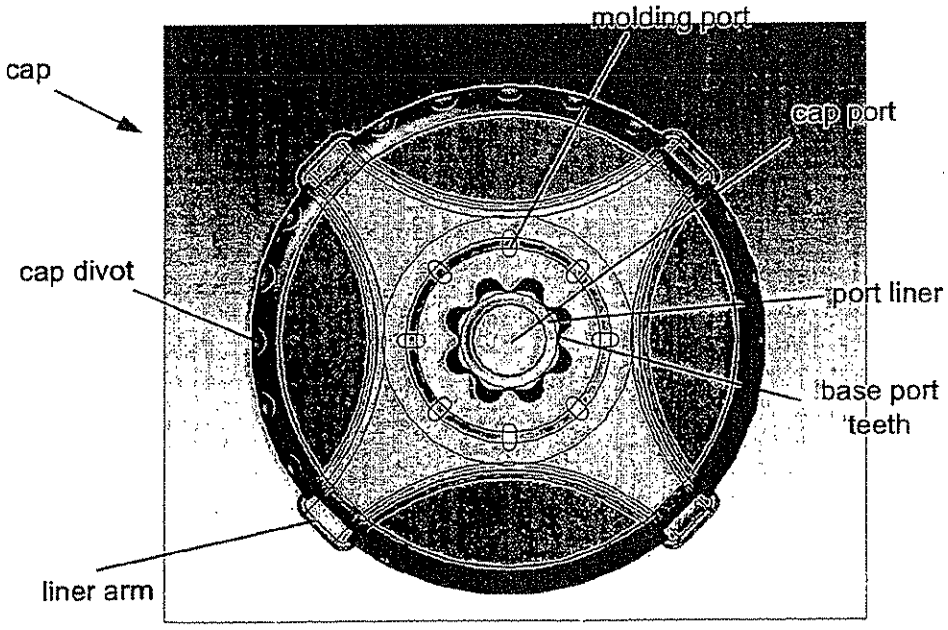

molding port
cap
cap port
cap divot
port liner
base port
teeth
liner arm

Fig. 7

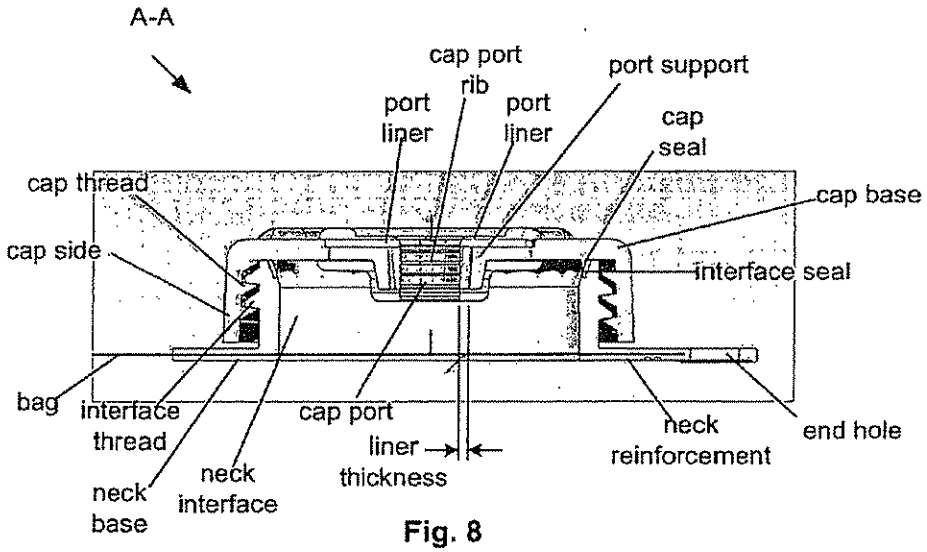

A-A
cap port rib
port support
port liner
port liner
cap seal
cap thread
cap base
cap side
interface seal
bag
interface thread
cap port
neck reinforcement
end hole
liner thickness
neck base
neck interface

Fig. 8

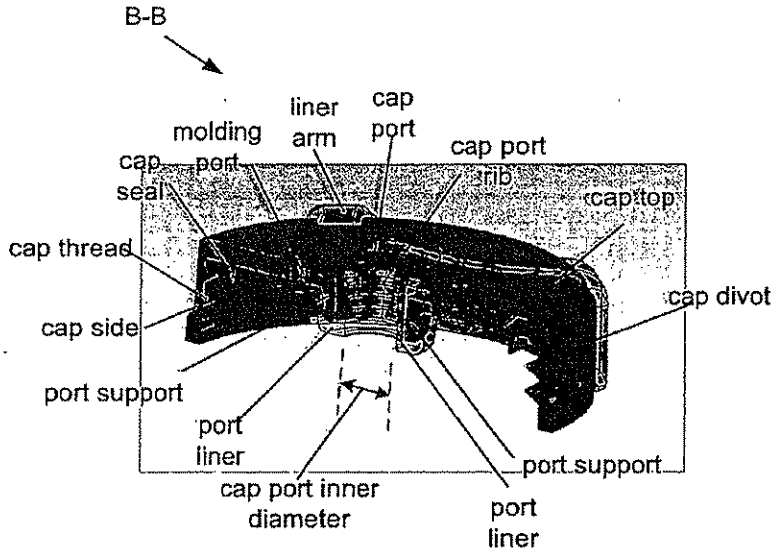

B-B
liner arm
cap port
molding port
cap port rib
cap seal
cap top
cap thread
cap divot
cap side
port support
port liner
port support
cap port inner diameter
port liner

Fig. 9

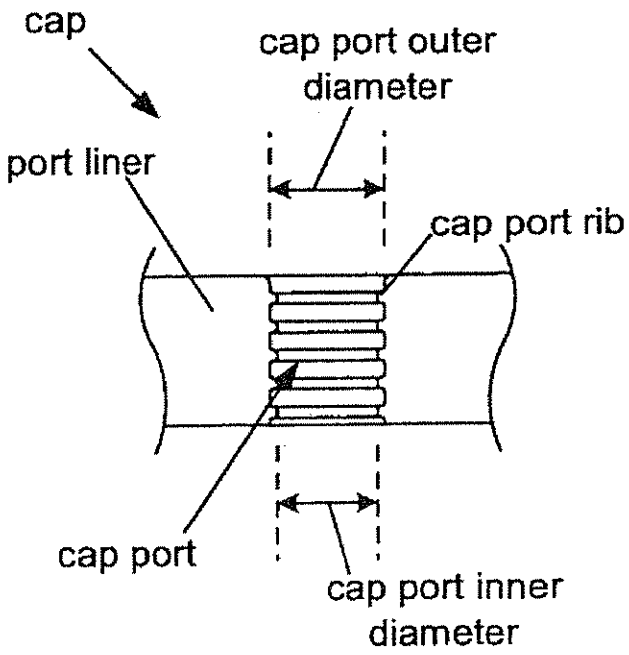


Fig. 10a

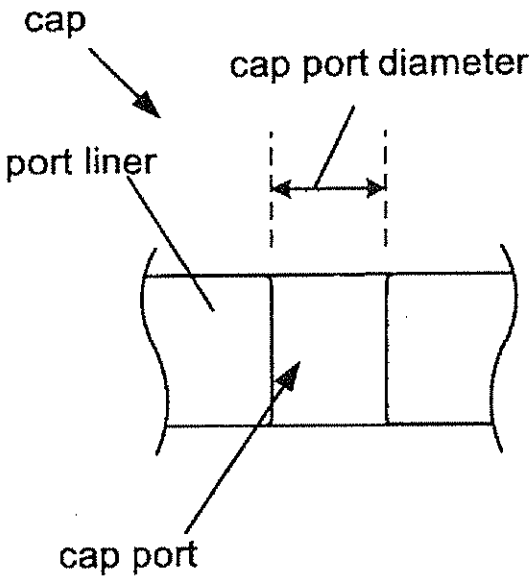


Fig. 10b

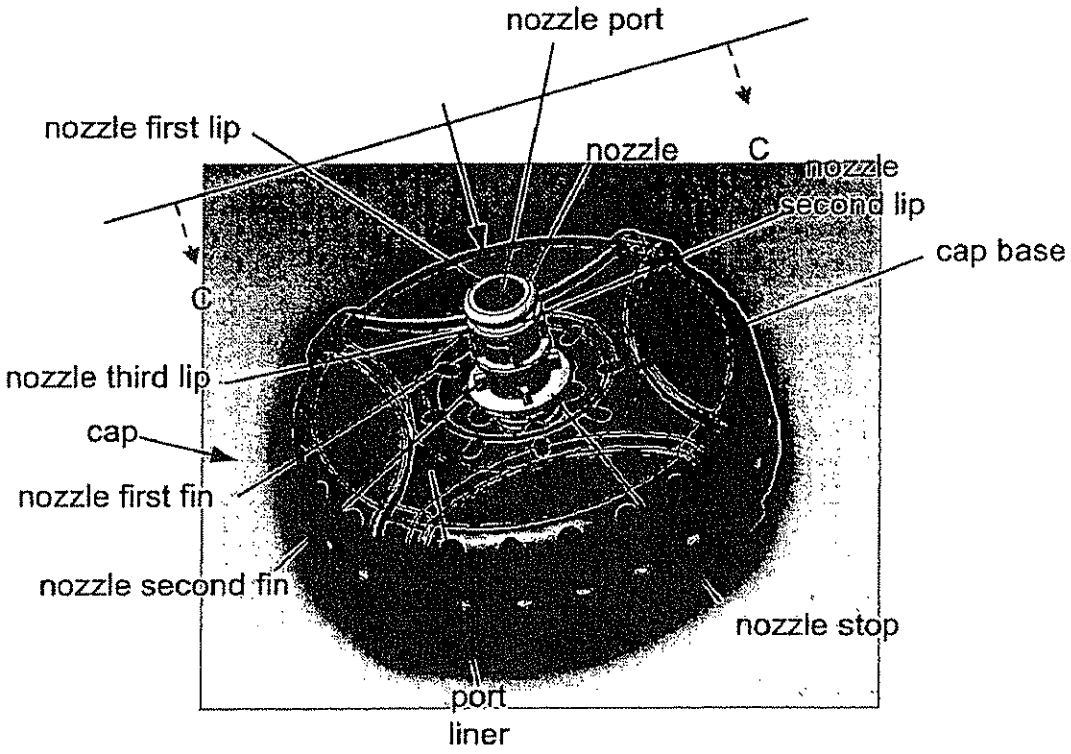

nozzle port
nozzle first lip
nozzle
C
nozzle second lip
cap base
C
nozzle third lip
cap
nozzle first fin
nozzle second fin
nozzle stop
port liner

Fig. 11

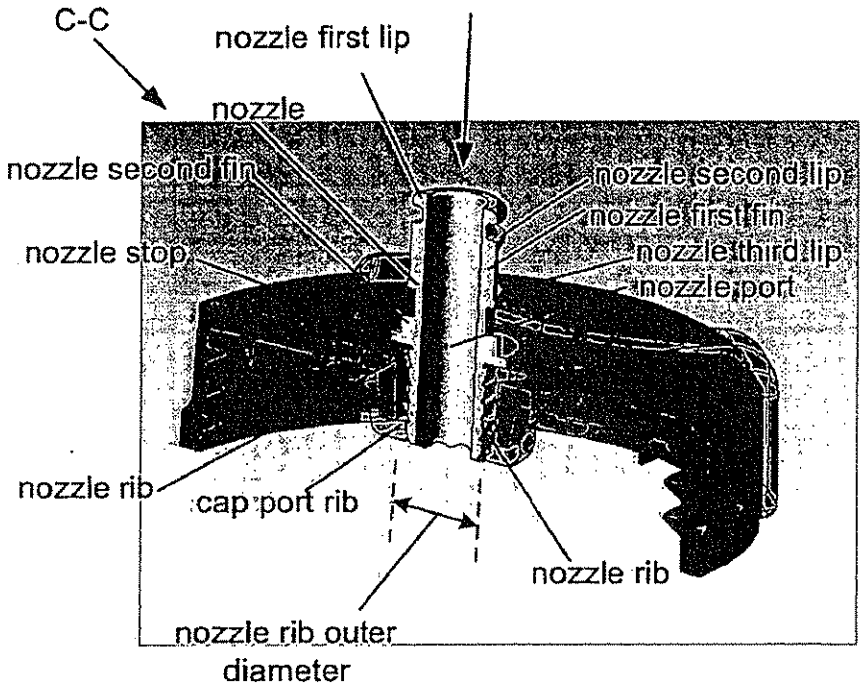

C-C
nozzle first lip
nozzle
nozzle second fin
nozzle second lip
nozzle first fin
nozzle stop
nozzle third lip
nozzle port
nozzle rib
cap port rib
nozzle rib
nozzle rib outer diameter

Fig. 12

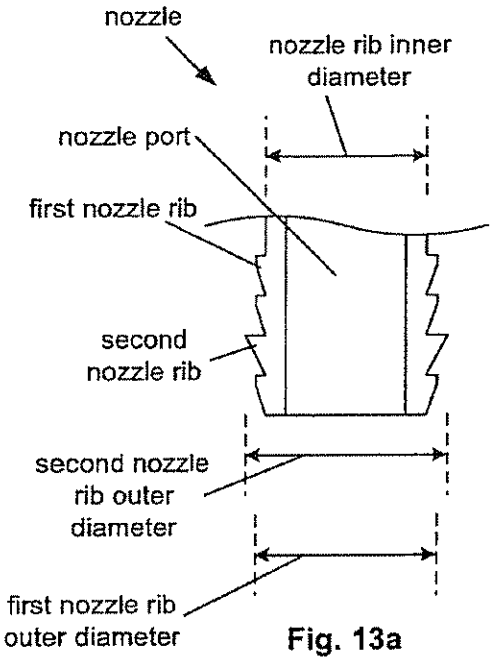


Fig. 13a

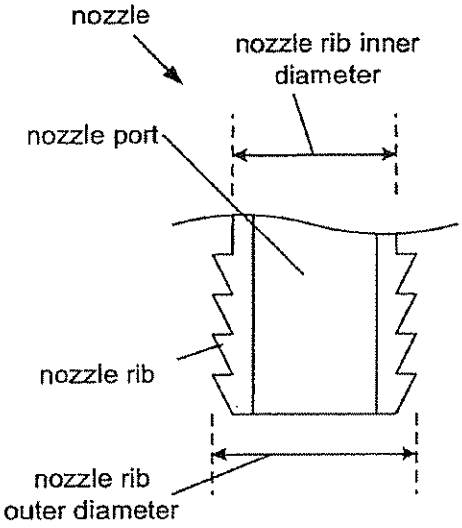


Fig. 13b

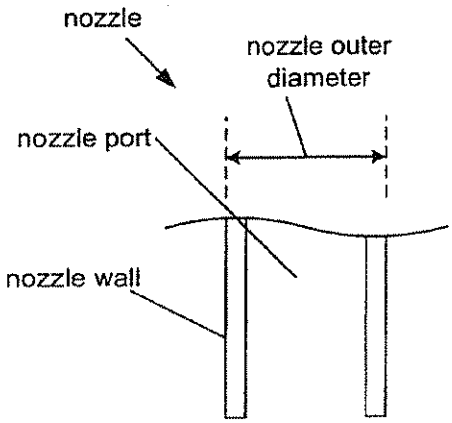


Fig. 13c

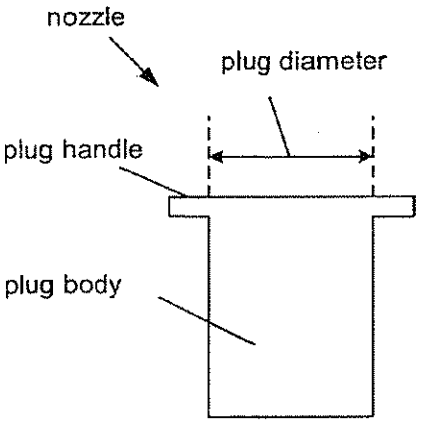


Fig. 13d

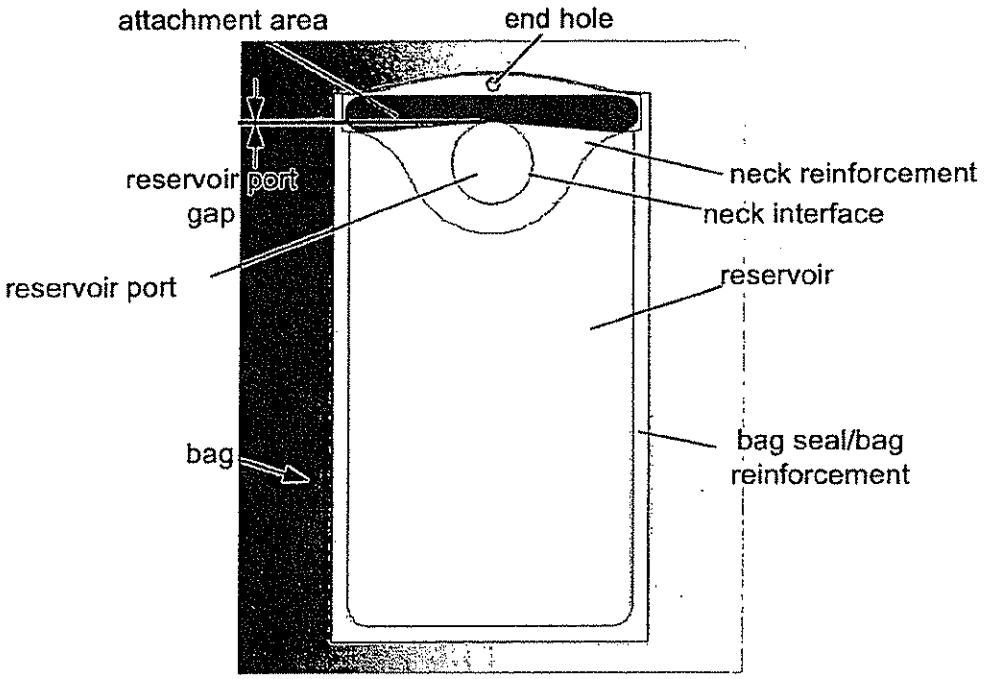

attachment area
end hole
reservoir port gap
neck reinforcement
neck interface
reservoir port
reservoir
bag
bag seal/bag reinforcement

Fig. 14

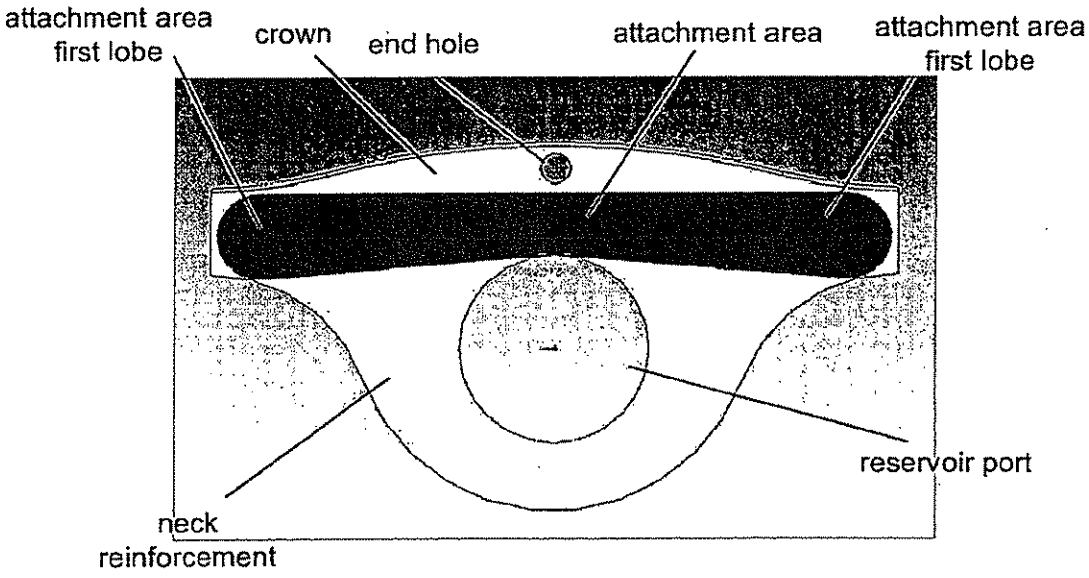

attachment area first lobe
crown
end hole
attachment area
attachment area first lobe
reservoir port
neck reinforcement

Fig. 15

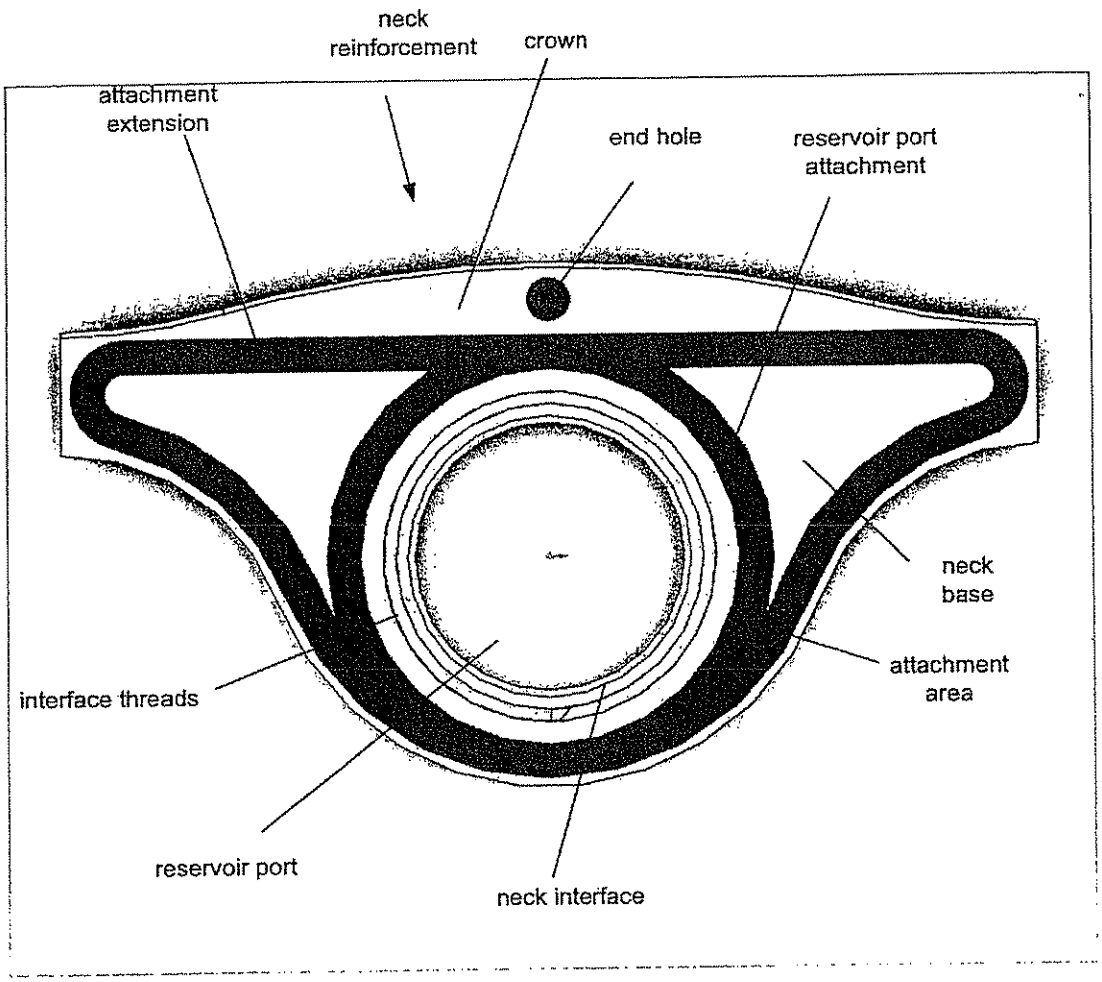

neck
reinforcement
crown
attachment
extension
end hole
reservoir port
attachment
neck
base
attachment
area
interface threads
reservoir port
neck interface

Fig. 16

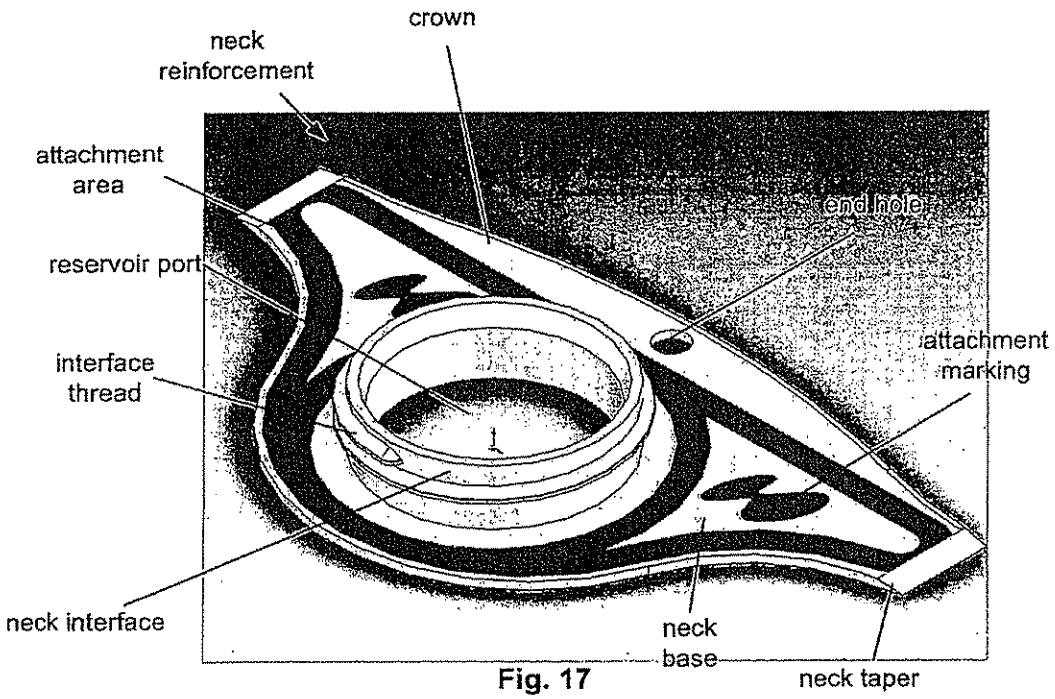

crown
neck reinforcement
attachment area
reservoir port
interface thread
neck interface
end hole
attachment marking
neck base
neck taper

Fig. 17

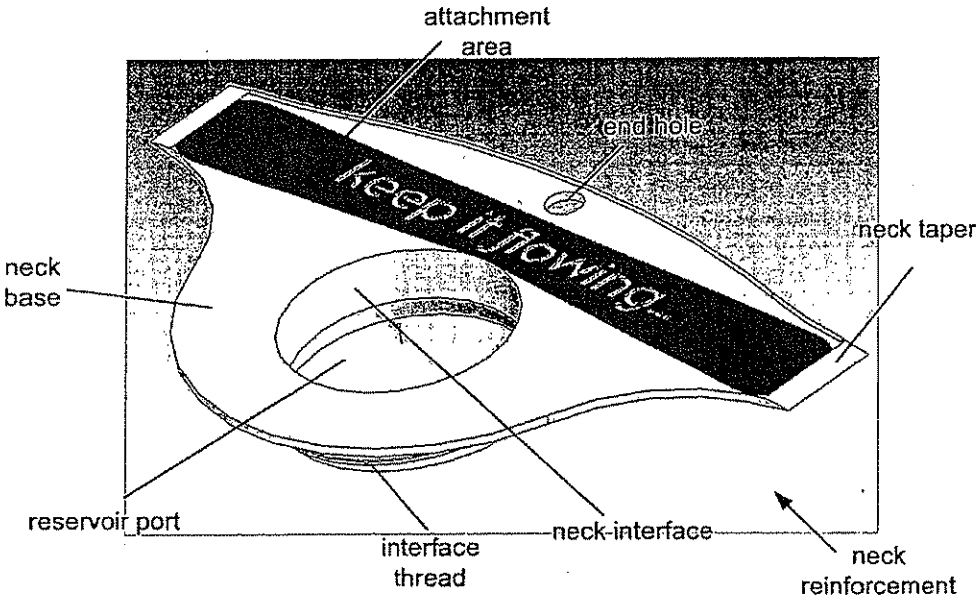

attachment area
end hole
keep it flowing...
neck taper
neck base
reservoir port
interface thread
neck-interface
neck reinforcement

Fig. 18

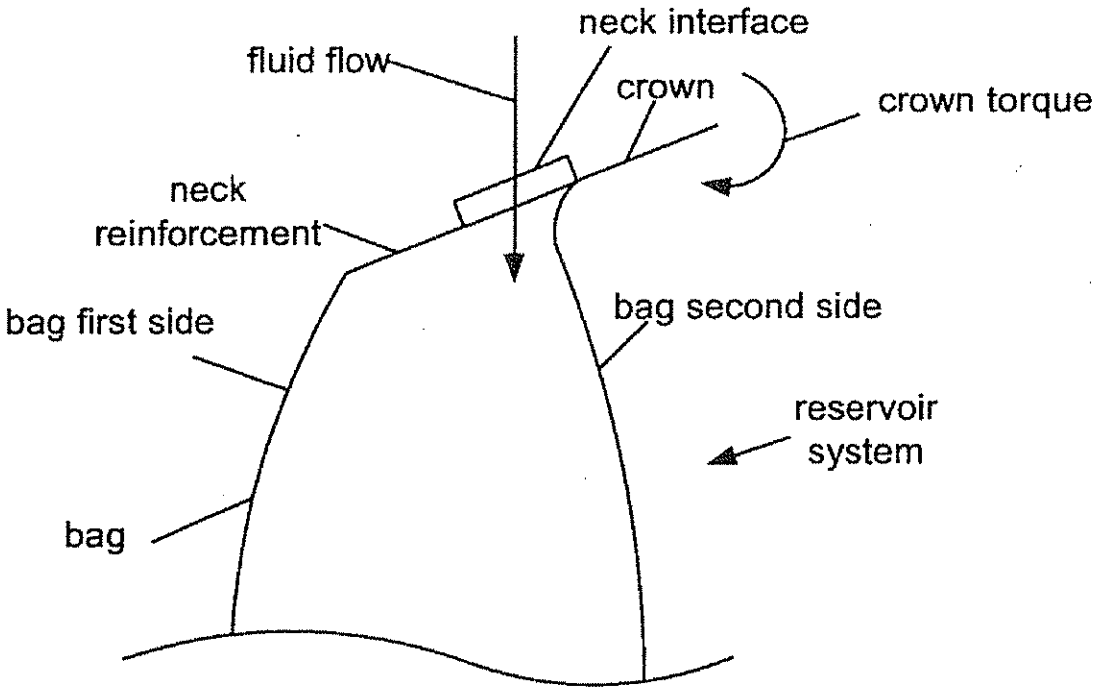

neck interface
fluid flow
crown
crown torque
neck
reinforcement
bag first side
bag second side
reservoir
system
bag

Fig. 19

RESERVOIR SYSTEM AND METHOD

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] This invention relates to the field of fluid reservoirs for fluid transport and dispensing.

[0003] 2. Description of the Related Art

[0004] Light weight, resealable bags are used increasingly in sporting activities, such as hiking, biking, and snow sport activities like skiing and snowboarding. Limited access to the interior of typical bags makes cleaning more difficult and increases the potential for unclean and unsanitary bags. Once liquids placed in the bags are consumed, the remaining deposits encourage the growth of bacteria and mold. The more deposits left behind, the more likely such growths will leave stains on the bag, the bag may retain odors, or taint any other fluids subsequently introduced into the bag, and create health risks. Regular and thorough cleaning of the inside of the reservoir is critical, as is the maximum drainage of the fluid contents.

[0005] Typical personal reservoir systems have large filling ports for filling and emptying the contents between uses. The filling ports are often spaced from the periphery of the reservoir, resulting in large amounts of the fluid contents being left in the reservoir when the reservoir is "turned over" to empty the remaining contents. Furthermore, the reservoir is often rectangular-shaped (when emptied) to make for easier and cheaper manufacturing. This rectangular shape also fails to direct the remaining fluid contents to the filling ports during emptying and cleaning of the typical reservoir system.

[0006] The fluid bags are often made from a single material, thus the reservoirs are often lined with the same material used to make the rest of the bag. Because manufacturers desire a material that performs well structurally and is easy to manufacture, these materials commonly leech into the fluid contents of the reservoir, resulting in an undesirable "plastic" taste of the fluid. This flavor is especially evident when the fluids are in the reservoir for an extended period of time or exposed to higher temperatures.

[0007] The reservoir systems are typically made with a filling port and a separate port for a straw or other tube. Having multiple ports in the reservoir systems increases manufacturing steps, and therefore manufacturing costs. Multiple ports also increase the complexity of the reservoir system, thereby reducing user enjoyment and expense of manufacture. Having multiple ports also increases likely failure points since each exiting port from the reservoir inherently has some connection that may be weaker than the surrounding material and/or increases stresses on the surrounding material.

[0008] Therefore a reservoir system that does not substantially alter the flavor of the contents of the reservoir system is desired. Furthermore, a reservoir system that can maximize the drainage of the fluid contents in the system and aid cleaning of the reservoir is desired. Additionally, a reservoir system that has a reduced number of ports is desired.

BRIEF SUMMARY OF THE INVENTION

[0009] A refillable reservoir system for fluid transport and dispensing is disclosed. The reservoir system has a container defining a reservoir. The reservoir is in fluid communication with a reservoir opening.

[0010] The reservoir system has a closure member having a first material and a second material. The second material is softer than the first material. The closure member is configured to cover the reservoir opening. The closure member has a closure member port.

[0011] The reservoir system has a fluid channel configured to attach to the closure member port. The closure member is configured to sealably attach to the fluid channel. The closure member port is at least partially surrounded by the second material.

[0012] The second material can be resilient. The second material can have silicone. The reservoir system can have a reinforcement element around the reservoir opening.

[0013] The closure member can be attached to the reinforcement member. The fluid channel can have a first rib. The first rib can attach to the second material.

[0014] The fluid channel can have a second rib. The second rib can be configured differently than the first rib. The second rib can attach to the second material.

[0015] Another refillable reservoir system for fluid transport and dispensing is disclosed. The reservoir system has a container defining a reservoir. The container has a reservoir port in fluid communication with the reservoir. The reservoir system has an ultra-stable material. The reservoir is substantially surrounded by with the ultra-stable material.

[0016] The ultra-stable material can include polyethylene. The container substantially consists of polyethylene, other than an ultra-stable lining. The container can have Nylon.

[0017] The reservoir system can have a closure member removably attached to the reservoir port. The closure member can include or not include the ultra-stable material.

[0018] Yet another refillable reservoir system for fluid transport and dispensing is disclosed. The reservoir system has a container defining a reservoir in fluid communication with the reservoir port. The reservoir is configured to have a neck. The neck tapers to the reservoir port. The distance from the reservoir port to a nearest edge of the reservoir to the reservoir port is less than about 1 cm (0.4 in.).

BRIEF DESCRIPTION OF THE FIGURES

[0019] FIG. **1** is a perspective view of an embodiment of the reservoir system.

[0020] FIG. **2** is a front view of the embodiment of the reservoir system of FIG. **1**.

[0021] FIG. **3** is a side view of the top of the embodiment of the reservoir system of FIG. **1**.

[0022] FIG. **4** is a side view of the top of an embodiment of the reservoir system.

[0023] FIG. **5** is a perspective view of an embodiment of the reservoir system.

[0024] FIG. **6** is a perspective view of an embodiment of the cap.

[0025] FIG. **7** is a top view of the cap of FIG. **6**.

[0026] FIG. **8** illustrates cross-section A-A of the top of the reservoir system of FIG. **5**.

[0027] FIG. **9** illustrates cross-section B-B of the cap of FIG. **6**.

[0028] FIGS. **10***a* and **10***b* are close up views of various embodiments of the cap port and surrounding area of FIG. **9**.

[0029] FIG. **11** is a perspective view of an embodiment of the cap attached to an embodiment of the nozzle.

[0030] FIG. **12** illustrates cross-section C-C of the cap and nozzle of FIG. **11**.

[0031] FIGS. **13***a* through **13***d* are close-up views of various embodiments of the cross-section of the nozzle.

[0032] FIG. **14** is a front view of an embodiment of the bag.

[0033] FIG. **15** is a front view of an embodiment of the neck reinforcement of FIG. **14**.

[0034] FIG. **16** is a front view of an embodiment of the neck reinforcement.

[0035] FIGS. **17** and **18** are perspective views of various embodiments of the neck reinforcement.

[0036] FIG. **19** illustrates a side view of an embodiment of a method for filling the reservoir system.

DETAILED DESCRIPTION

[0037] FIGS. **1** and **2** illustrate that a reservoir system can have a container, such as a bag and a sealing member, such as a removably attachable cap, for example at a drainage end of the reservoir system. The bag can have at least one hollow chamber, such as the reservoir. The reservoir can be lined with an ultra-stable material, such as a durable, resilient film. The ultra-stable material can be formed into an embossed and/or extruded laminate film (e.g., to line the reservoir). The bag can be made entirely or in part from the ultra-stable material. The bag can be spray-coated, dip-coated, static-charge coated, or otherwise coated along the surface of the reservoir with the ultra-stable material. The ultra-stable material can be a material that will minimally leech into fluids during normal operating conditions (e.g., temperatures below about 180° F.). The ultra-stable material can be polyethylene, antimicrobial materials, such as silver ion (e.g., AgION from AgION Technologies, Inc., Wakefield, Mass.), ultra-stable zinc-based antimicrobial products (e.g., Microban® by Microban International, Ltd., New York, N.Y.) or combinations thereof.

[0038] Other than the ultra-stable material, the bag can be made from ethylene vinyl acetate (EVA), Nylon, modified low density polyethylene, polytetrafluoroethylene (PTFE), polyurethane (e.g., thermoplastic polyurethane (TPU)), polyvinyl chloride (PVC), thermoplastic elastomer (TPE), polyoxymethylene (POM), also known as acetal resin, polytrioxane and polyformaldehyde (e.g., Delrin by E.I. du Pont de Nemours and Company, Wilmington, Del.), Nylon, or combinations thereof.

[0039] The reservoir can be configured to be filled and/or emptied (i.e., drained) of fluid contents at the drainage end.

[0040] The bag can have a bag seal or bag reinforcement. The bag can be made from two sheets or layers of material. The two sheets of the material can join together at the bag seal. The bag seal can be around the perimeter of the reservoir. The bag seal can be additionally reinforced with additional material, adhesive, temperature (e.g., weld) or chemical treatment, or combinations thereof.

[0041] The reservoir system can have a neck reinforcement. The neck reinforcement can be integral with, or separate and attached to, the bag. The neck reinforcement can be made from a thicker material and/or more layers of material than the remainder of the bag. The neck reinforcement can be made from a different material or a differently treated material to provide additional structural strength than the bag.

[0042] The cap can be screwed, friction fit, interference fit (e.g., with a mechanical latch), snap-fit, otherwise attached, or combinations thereof, to the bag or the neck reinforcement. The reservoir system can have a fluid channel (e.g., having a lumen) attached to the cap. The fluid channel can be one or more flexible or rigid tubes (e.g., a straw), a nozzle, or combinations thereof. The nozzle can be attached at a nozzle first end to the cap and at a nozzle second end to a tube (not shown). The nozzle can be fixedly or removably inserted into the cap.

[0043] The reservoir can be shaped to have a corner, gulley, valley, gutter, depression, neck or other shaped exit (referred to herein as the neck for clarity of explanation) formed by the bag seal at the drainage end. The neck can be configured to maximize drainage (i.e., ejection fraction) of the contents of the reservoir, for example, when the cap is removed from the bag and the bag is oriented with the drainage end pointed down.

[0044] The reservoir system can have a handle. The handle can be removably interference fit between the cap and the bag (e.g., the neck reinforcement).

[0045] One or more markings (e.g., branding, instructions) can be applied to any or all of the elements, as shown for illustrative purposes on the handle and cap. The markings can be printed, embossed, cut, etched, recessed or raised in a mold, stamped, otherwise applied, or combinations thereof.

[0046] FIGS. **3** and **4** illustrate that the handle can have an anchoring section configured to fit between the cap and the bag (e.g., neck reinforcement). The anchoring section can be substantially flat. The handle can have a grasping section. The grasping section can be ergonomically contoured (e.g., curved for easier grasping by hand). The grasping section can have a vane, for example to structurally reinforce the grasping section and/or to simplify manufacturing.

[0047] The nozzle can be inserted into the radial center of the cap. The reservoir system can have no nozzle. The cap can have no port.

[0048] FIG. **5** illustrates that the reservoir system can have no handle. The bag and/or neck reinforcement can have an end hole. The end hole can be at the center of the drainage end. A post or other elongated or curved member can be passed through the end hole to removably attach the reservoir system, for example, to a sales display, a carrying pouch (e.g., a backpack or knapsack), a machine for manufacturing, or combinations thereof.

[0049] FIGS. **6** and **7** illustrate that the cap can have a cap base and a port liner. The cap base can be attached to and/or integral with the port liner. The port liner can be overmolded on the cap base. The overmolding can cause the port liner to be separate but fixedly attached to the cap base (i.e., being molded through and around the molding ports).

[0050] The cap base can be made from a cap base material. The port liner can be made from a port liner material. The port liner material can have a port liner hardness. The can base material can have a cap base hardness. The cap base hardness can be greater than the port liner hardness by from about 1% to about 400%, more narrowly from about 2% to about 300%, for example about 10%. The cap base hardness can be, for example, about 70 Shore D. The port liner hardness can be, for example, about 75 Shore A. The cap base material can be polypropylene, polyethylene, metal (e.g., aluminum, steel). The port liner material can be a low-friction material, for example a thermoplastic elastomer (e.g., Dynaflex® and Kraton® by GLS Corp, McHenry, Ill.), silicone, PVC, polyurethane (e.g., TPU), or combinations

thereof. The cap base material and/or the port liner material can be resilient. The cap base material and/or the port liner material can be deformable.

[0051] The cap base can have base port teeth. The base port teeth can extend toward the cap port. The port liner can be configured to mimic the configuration of the base port teeth (e.g., by being molded around the base port teeth). The cap base can have, for example, about eight base port teeth. The base port teeth can be evenly angularly distributed around the cap port.

[0052] The cap base can have molding ports. The port liner can completely or partially pass through the molding ports. The port liner can be attached to the cap base at the molding ports. The cap base can have, for example, about eight molding ports. The molding ports can be evenly angularly distributed around the cap port.

[0053] The cap base can have cap divots, for example, on the radial outside of the cap base. The cap divots can be higher-friction texturing than the remainder of the cap base. The cap base can have, for example, about 20 cap divots. The cap divots can be evenly angularly distributed around the cap port.

[0054] The port liner can have liner arms that extend to the radial outside of the cap base. The cap base can have, for example, about four liner arms. The liner arms can be evenly angularly distributed around the cap port.

[0055] FIG. **8** illustrates that the cap can be attached to the neck reinforcement and/or the bag. The neck reinforcement and/or bag can have a neck base. The neck reinforcement and/or bag can have a neck interface. The neck interface can extend at about a 90° angle from the neck base. The neck interface can be elevated or recessed from the remainder of the neck reinforcement and/or bag (e.g., the neck interface can protrude into the reservoir). The neck interface can be configured to sealably and removably attach to the cap.

[0056] The neck interface can have one or more interface threads. The cap can have one or more cap threads that can align with the interface threads. When the cap is in a sealably attached configuration with the neck interface, the cap threads can sealably attach to the interface threads. The cap can have a cap seal. The interface can have an interface seal. The interface seal and/or the cap seal can be integral with and/or attached to, and made from the same or different materials from the rest of, the neck interface and/or cap, respectively. When the cap is in a sealably attached configuration with the neck interface, the cap seal can create a fluid-tight seal with the interface seal.

[0057] The cap base can have a port support. The port support can be a section of the cap base that surrounds the cap port. The port support can be covered by the port liner. The thickness of the port liner between the cap port and the port support can be a liner thickness. The liner thickness can be about 1.5 mm (0.059 in.).

[0058] The port liner can have port ribs configured adjacent to the cap port. The port ribs can, for example, improve the seal and attachment to the nozzle or other conduit (e.g., tube, straw, mouthpiece).

[0059] FIG. **9** illustrates that the cap can have a cap side and a cap top. The cap side can extend from the cap top at about a 90° angle. The cap side can have the cap divots and the cap thread. The cap top can have the molding ports, the cap seal, the port support, and define the cap port.

[0060] The cap port can have a cap port inner diameter. The cap port inner diameter can be about 10 mm (0.39 in.).

[0061] FIG. **10***a* illustrates that the cap port ribs can radially extend toward the cap port. The cap port inner diameter, for example, can be the distance between the farthest extensions of the cap port ribs. The cap port can have a cap port outer diameter. The cap port outer diameter can be the distance measured from the radially recessed points between the cap port ribs. The cap port outer diameter can be about 10.5 mm (0.413 in.).

[0062] FIG. **10***b* illustrates that the cap port can have no ribs. The cap port can have substantially flat walls. The cap port can have a cap port diameter. The cap port diameter can be from about 10 mm (0.39 in.) to about 10.5 mm (0.413 in.).

[0063] FIGS. **11** and **12** illustrate that the nozzle can be translatably inserted into the cap port, as shown by arrow. The nozzle can be sealably attached to the cap. The nozzle can be removably or substantially fixedly attached to the cap. The nozzle can be press fit into the cap port. The nozzle can be rotatable in the cap port. The nozzle can be configured to attach to a tube, straw, mouthpiece, or combinations thereof. The nozzle can have a nozzle first lip, a nozzle second lip, a nozzle third lip, and combinations thereof. The nozzle lips can, for example, structurally reinforce the nozzle and/or attach to a tube, straw, mouthpiece, or combinations thereof.

[0064] The nozzle can have a nozzle stop. The nozzle stop can be a radially extended section of the nozzle. The nozzle stop can, for example, prevent the nozzle from inserting too far into the cap port.

[0065] The nozzle can have one or more nozzle fins, such as a nozzle first fin and a nozzle second fin. The nozzle fins can have a thin angular dimension, radially extend from the remainder of the nozzle, and extend longitudinally. The nozzle fins can extend between adjacent nozzle lips. The nozzle fins can, for example, for example, provide structurally reinforce the nozzle and/or attach to a tube, straw, mouthpiece, or combinations thereof.

[0066] The nozzle can have one or more nozzle ribs. The nozzle ribs can have a nozzle rib outer diameter. The nozzle rib outer diameter can be greater than the cap port outer diameter by from about 0.1 mm (0.004 in.) to about 1 mm (0.04 in.), for example about 0.2 mm (0.008 in.).

[0067] FIG. **13***a* illustrates that the nozzle can have one or more first nozzle ribs and one or more second nozzle ribs. The first nozzle ribs can have a different configuration from the second nozzle ribs. The nozzle can have a first nozzle rib outer diameter, a second nozzle rib outer diameter and a nozzle rib inner diameter. The first nozzle rib outer diameter can be, for example, about 10.9 mm (0.429 in.). The second nozzle rib outer diameter can be, for example, about 11.15 mm (0.4389 in.). The nozzle rib inner diameter can be, for example, about 10.0 mm (0.394 in.).

[0068] FIG. **13***b* illustrates that the nozzle can have nozzle ribs with a uniform configuration (e.g., the second nozzle rib only, with no first nozzle ribs). The nozzle ribs can have a nozzle rib outer diameter, for example, about 11.15 mm (0.4389 in.).

[0069] FIG. **13***c* illustrates that the nozzle can have no ribs. The nozzle can have substantially flat nozzle walls. The nozzle outer diameter can be from about 10.0 mm (0.394 in.) to about 11.15 mm (0.4389 in.).

[0070] FIG. **13***d* illustrates that the nozzle can be configured to completely obstruct the flow of fluid. The nozzle can have a plug body and a plug handle. The plug body can have

a plug diameter. The plug diameter can be from about 10.0 mm (0.394 in.) to about 11.15 mm (0.4389 in.). The plug body can be solid.

[0071] FIG. **14** illustrates that the reservoir can have a reservoir port. The cap can sealably close the reservoir port. The reservoir can have a reservoir port gap between the reservoir port and the end of the reservoir. The reservoir port gap can be less than 1 cm (0.4 in.), for example about 0 mm (0 in.).

[0072] The neck reinforcement can have an attachment area. The attachment area can be the location where the neck reinforcement attaches to and/or integrates with the bag. The attachment area can have additional material, adhesive, temperature (e.g., weld) or chemical treatment, or combinations thereof. The attachment area can also be additionally reinforced relative to the remainder of the neck reinforcement, as described above.

[0073] FIG. **15** illustrates that the attachment area can have an attachment area first lobe at a first end of the attachment area. The attachment area can have an attachment area second lobe at a second end of the attachment area. The attachment area lobes can be taller (i.e., the up/down dimension on the page of the figure) than the remainder of the attachment area. The attachment area can be substantially the same width as the neck reinforcement.

[0074] The bag can have a bag first side and a second side. The bag first side can be attached to the bag second side at the bag seal, for example. The attachment area can be attached to the bag first side and/or the bag second side. For example, the bag first side can attach to the entire neck reinforcement and the bag second side can attach to the attachment area.

[0075] The neck reinforcement can have a crown. The crown can extend toward the end hole. The crown can be configured, for example, structurally support for the end hole (e.g., when the end hole supports the entire weight of the reservoir system). The attachment extension can circumvent the crown.

[0076] FIG. **16** illustrates that the attachment area can have a configuration to maximize attachment forces between the bag and neck reinforcement and minimize attachment area. The attachment area can have a reservoir port attachment. The reservoir port attachment can substantially encircle the reservoir port. The attachment area can have an attachment extension. The attachment extension can extend substantially along the periphery of the neck reinforcement.

[0077] FIG. **17** illustrates that the neck interface can be elevated from the neck base. The attachment area can be configured to include attachment markings. The attachment markings can be formed as described, supra. The markings can be text, designs, logos, other images, or combinations thereof.

[0078] The neck reinforcement can have one or more neck tapers at one or locations around the periphery of the neck reinforcement. The neck tapers can be configured to attach to the bag seals.

[0079] FIG. **18** illustrates that the neck interface can be recessed from the neck base. The neck interface can protrude into the reservoir. The markings can be not part of the attachment area, but completely surrounded by the attachment area.

[0080] FIG. **19** illustrates that prior to filling the bag with a fluid, the cap can be removed from the neck interface. The fluid can be poured (shown by arrow) through the reservoir port. The reservoir system can be held by the crown when filling the reservoir with a fluid. A torque, shown by arrow, can be applied to the crown to rotate the neck reinforcement closer to the horizontal. The bag second side can be attached to the neck reinforcement above the neck interface. The bag first side and bag second side can move away from the second side when the neck reinforcement is rotated closer to the horizontal, as shown. The fluid flow path can be unobstructed by the bag second side during filling.

[0081] After the reservoir is filled, the cap can be attached to the reservoir port. The nozzle can be placed in the cap port. The nozzle can be removed and replaced with any desired nozzle. The nozzle can be a quick-release nozzle. The nozzle can attach to a series of nozzles. The nozzle can attach to a hose or tube. The nozzle can have a splitter and/or valve, controlling the flow and/or diverting the flow to two or more paths (e.g., to two hoses or tubes). The contents of the reservoir can be dispensed through the cap port.

[0082] Any elements, configurations, characteristics, and methods of use can be utilized from U.S. patent application having attorney docket number HYDRNZ00100 and filed concurrently which is incorporated herein by reference in its entirety.

[0083] Any elements described herein as singular can be pluralized (i.e., anything described as "one" can be more than one). Any species element of a genus element can have the characteristics or elements of any other species element of that genus. The above-described configurations, elements or complete assemblies and methods and their elements for carrying out the invention, and variations of aspects of the invention can be combined and modified with each other in any combination.

We claim:

1. A refillable reservoir system for fluid transport and dispensing comprising:

a container defining a reservoir in fluid communication with a reservoir opening;

a closure member comprising a first material and a second material, wherein the second material is softer than the first material, the closure member configured to cover the reservoir opening, wherein the closure member has a closure member port; and

a fluid channel configured to attach to the closure member port;

wherein the closure member is configured to sealably attach to the fluid channel, and wherein the closure member port is at least partially surrounded by the second material.

2. The system of claim **1**, wherein the second material is resilient.

3. The system of claim **1**, wherein the second material comprises silicone.

4. The system of claim **1**, further comprising a reinforcement element around the reservoir opening.

5. The system of claim **4**, wherein the closure member is attached to the reinforcement member.

6. The system of claim **1**, wherein the fluid channel comprises a first rib, and wherein the first rib attaches to the second material.

7. The system of claim **6**, wherein the fluid channel comprises a second rib, wherein the second rib is configured differently than the first rib, and wherein the second rib attaches to the second material.

8. A refillable reservoir system for fluid transport and dispensing comprising:

a container defining a reservoir, the container having a reservoir port in fluid communication with the reservoir; and

an ultra-stable material, wherein the reservoir is substantially surrounded by with the ultra-stable material.

9. The system of claim **8**, wherein the ultra-stable material comprises polyethylene

10. The system of claim **9**, wherein the container substantially consists of polyethylene.

11. The system of claim **8**, wherein the container comprises nylon.

12. The system of claim **8**, further comprising a closure member removably attached to the reservoir port.

13. The system of claim **12**, wherein the closure member does not comprise the ultra-stable material.

14. The system of claim **12**, wherein the closure member comprises the ultra-stable material.

15. A refillable reservoir system for fluid transport and dispensing comprising:

a container defining a reservoir in fluid communication with a reservoir opening;

a closure member comprising a press-fit port; and

a fluid channel configured to releasably attach to the press-fit port.

16. A refillable reservoir system for fluid transport and dispensing comprising:

a container defining a reservoir, the container having a reservoir port in fluid communication with the reservoir, wherein the reservoir is configured to have a neck, wherein the neck tapers to the reservoir port; wherein the distance from the reservoir port to a nearest edge of the reservoir to the reservoir port is less than about 1 cm.

* * * * *

US 20070280564A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2007/0280564 A1

Lyon et al. (43) Pub. Date: Dec. 6, 2007

(54) RESERVOIR CLOSURE SYSTEM AND METHOD

(75) Inventors: Matthew J. Lyon, Moraga, CA (US); Samuel M. Lopez, San Francisco, CA (US)

Correspondence Address:
LEVINE BAGADE HAN LLP
2483 EAST BAYSHORE ROAD, SUITE 100
PALO ALTO, CA 94303

(73) Assignee: HYDRAPAK, INC., Emeryville, CA (US)

(21) Appl. No.: 11/445,721

(22) Filed: Jun. 2, 2006

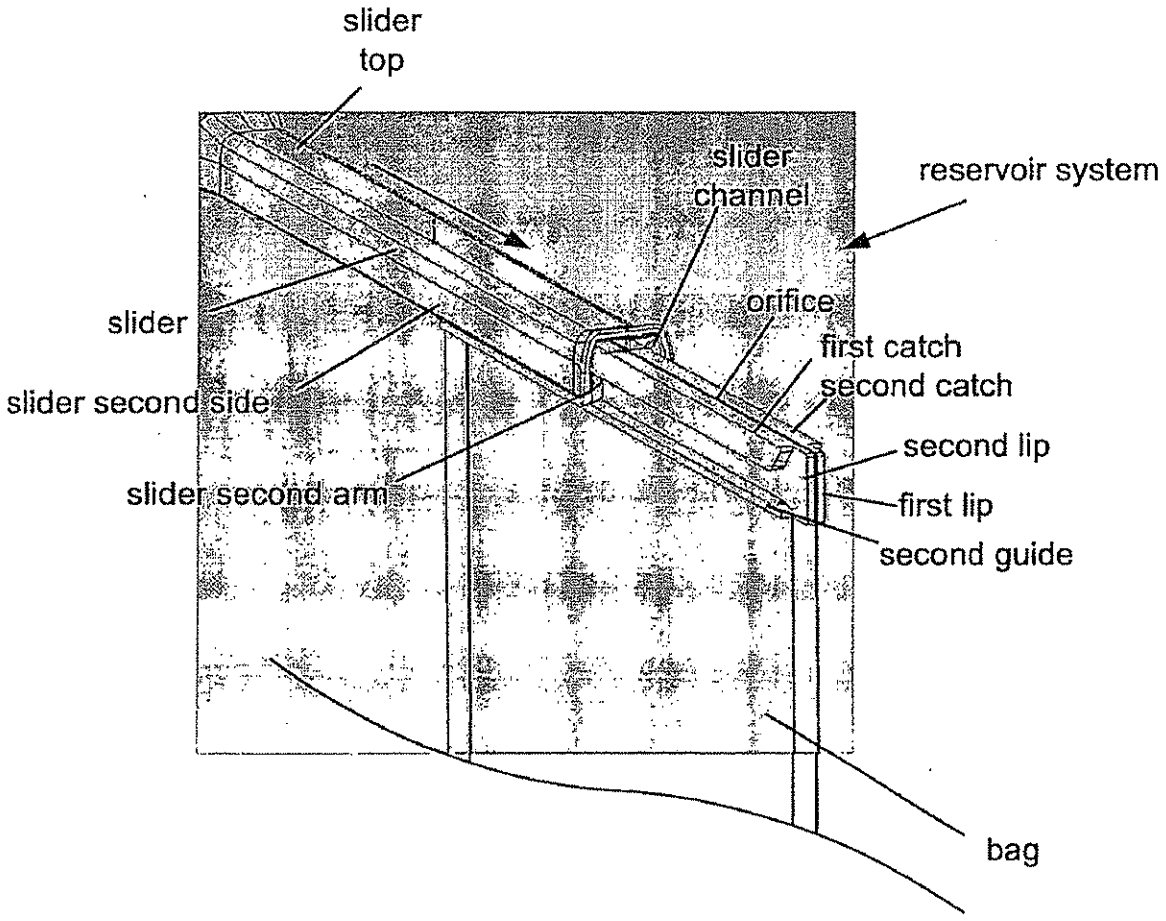
Publication Classification

(51) Int. Cl.
B65D 33/16 (2006.01)

(52) U.S. Cl. 383/69

(57) ABSTRACT

A system for sealably closing a reservoir is disclosed. The system can have a container and a slider. The container can have an orifice and catches and lips surrounding the orifice. The slider can be translatably attached to the container over the orifice. The slider can slidably engage the catch and lips to force the orifice closed. While attached to the catch and lips, the slider can create a pressurized seal of the orifice.



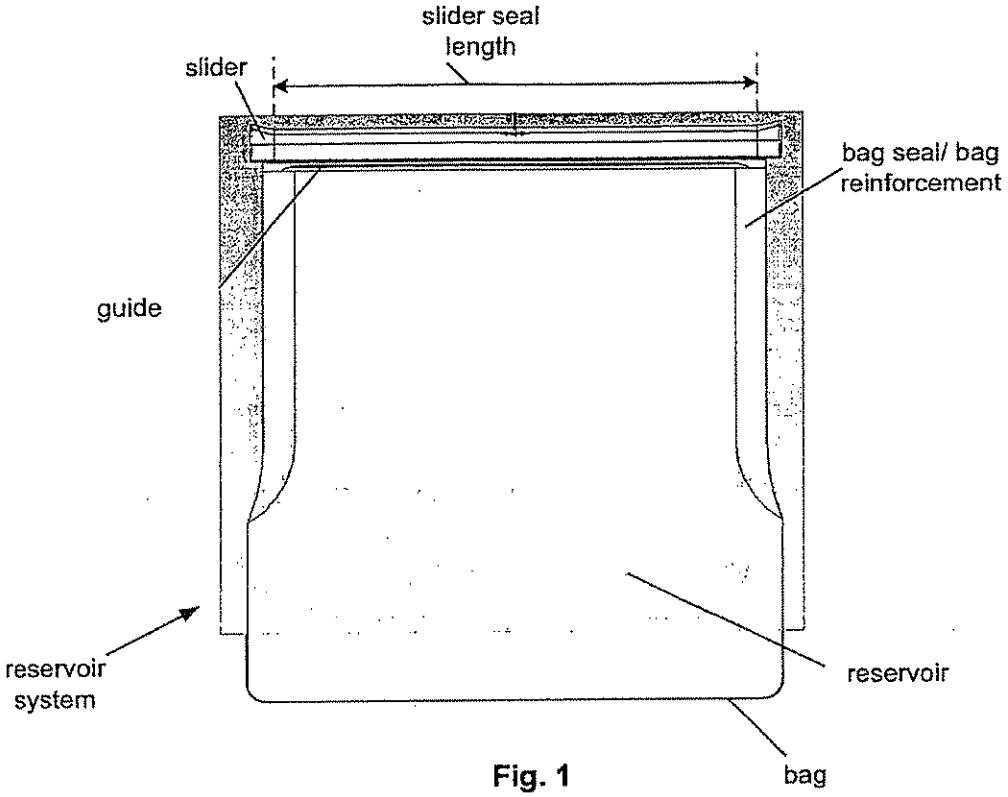

slider seal
length
slider
bag seal/ bag
reinforcement
guide
reservoir
system
reservoir
bag

Fig. 1

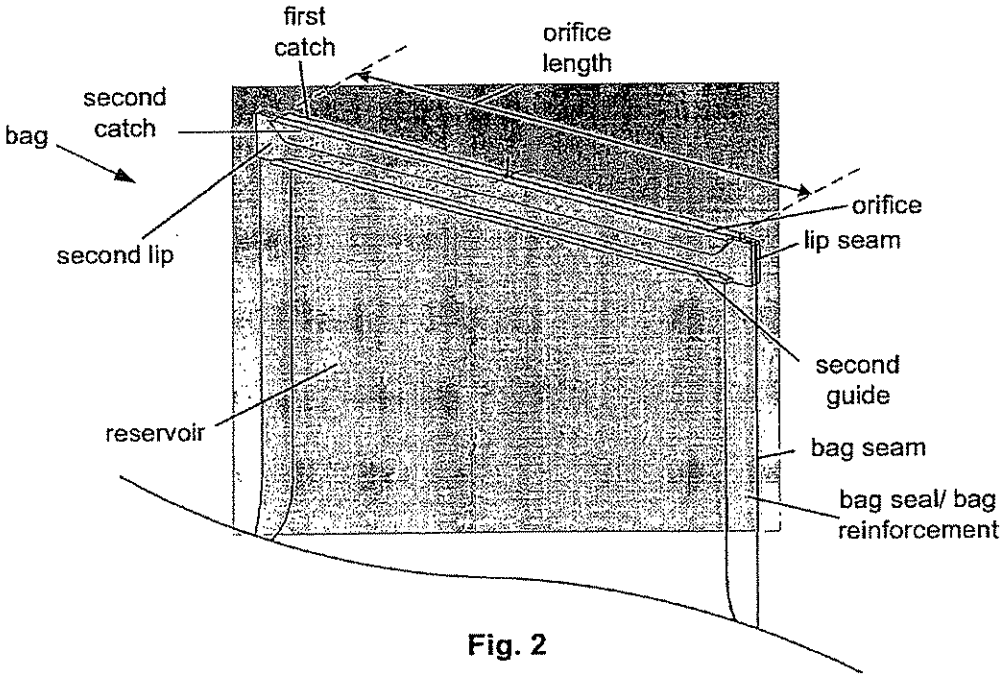

first
catch
orifice
length
second
catch
bag
orifice
lip seam
second lip
second
guide
reservoir
bag seam
bag seal/ bag
reinforcement

Fig. 2

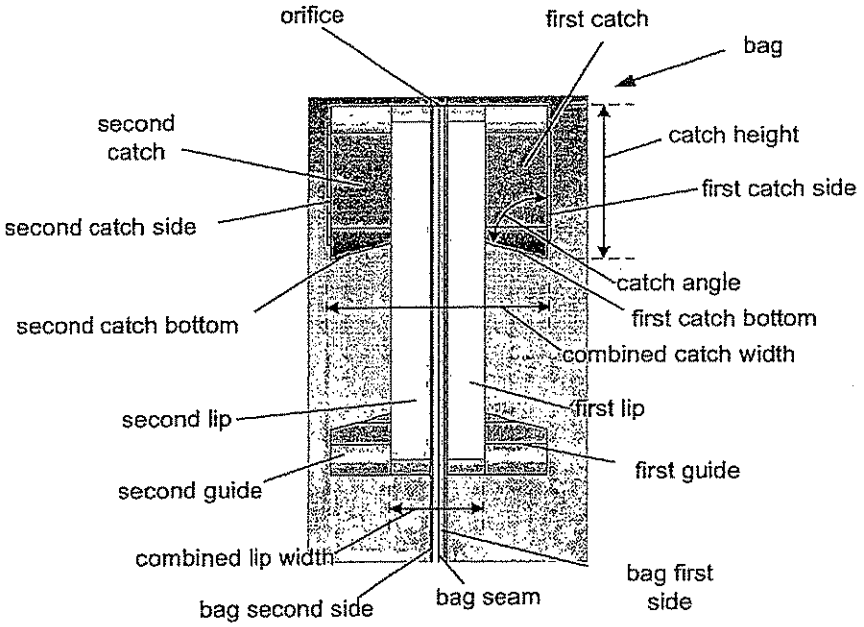


Fig. 3a

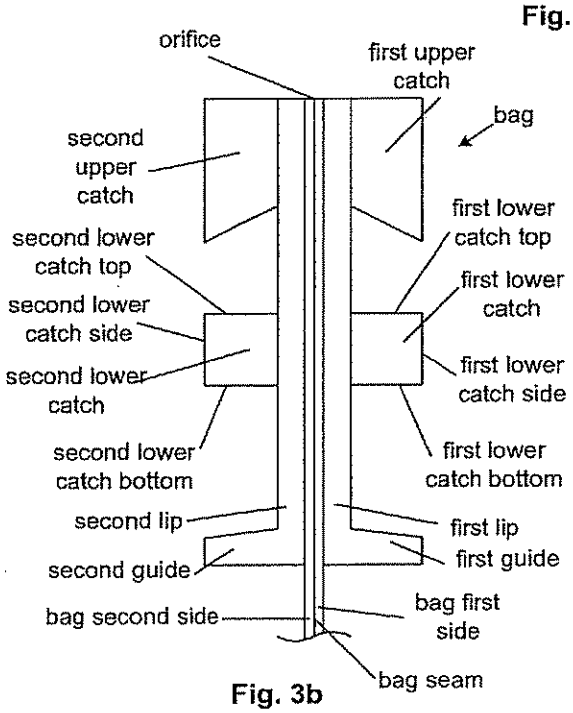


Fig. 3b

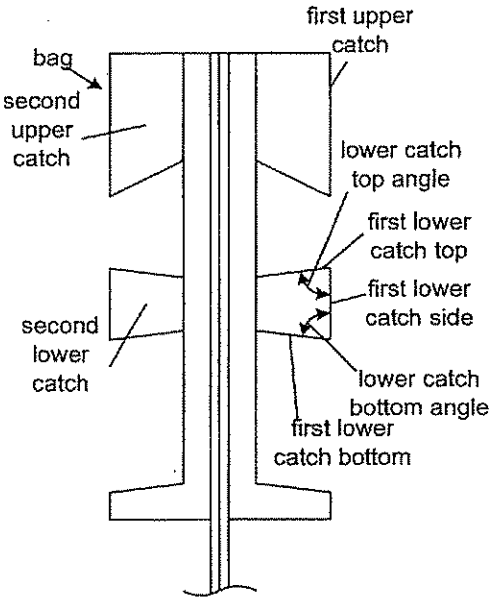


Fig. 3c

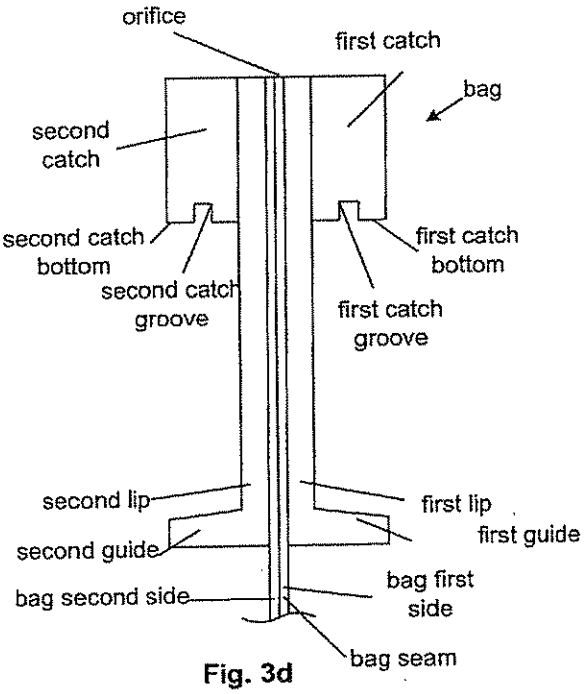

orifice
first catch
bag
second catch
second catch bottom
second catch groove
first catch bottom
first catch groove
second lip
first lip
first guide
second guide
bag second side
bag first side
bag seam

Fig. 3d

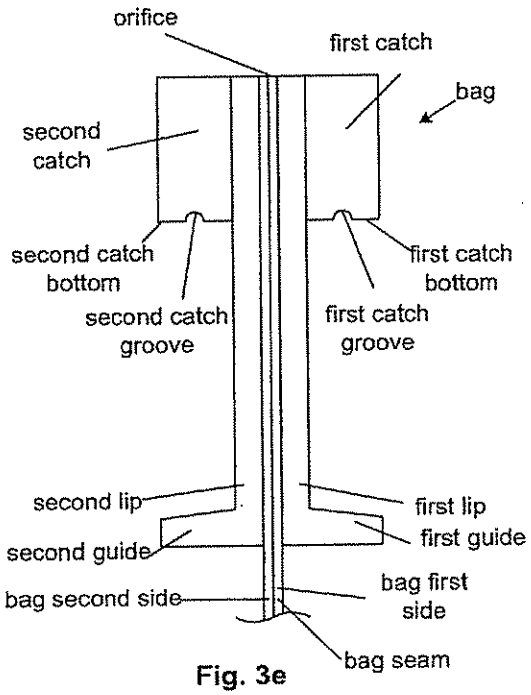

orifice
first catch
bag
second catch
second catch bottom
second catch groove
first catch bottom
first catch groove
second lip
first lip
first guide
second guide
bag second side
bag first side
bag seam

Fig. 3e

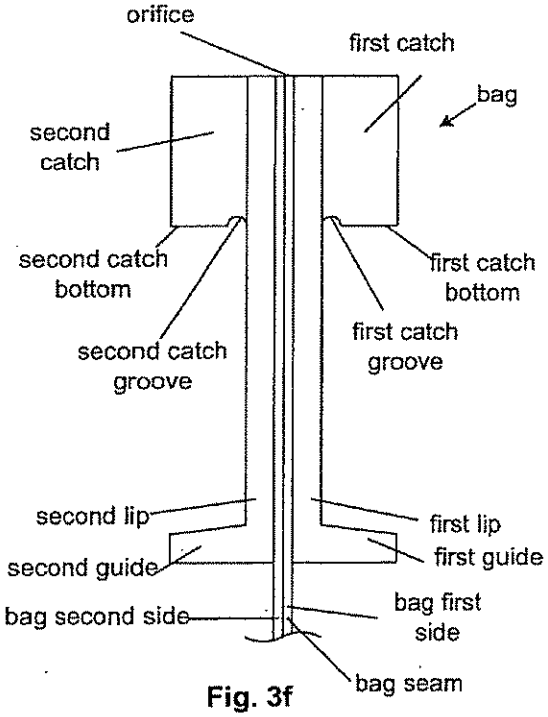

orifice
first catch
bag
second catch
second catch bottom
first catch bottom
second catch groove
first catch groove
second lip
first lip
second guide
first guide
bag second side
bag first side
bag seam

Fig. 3f

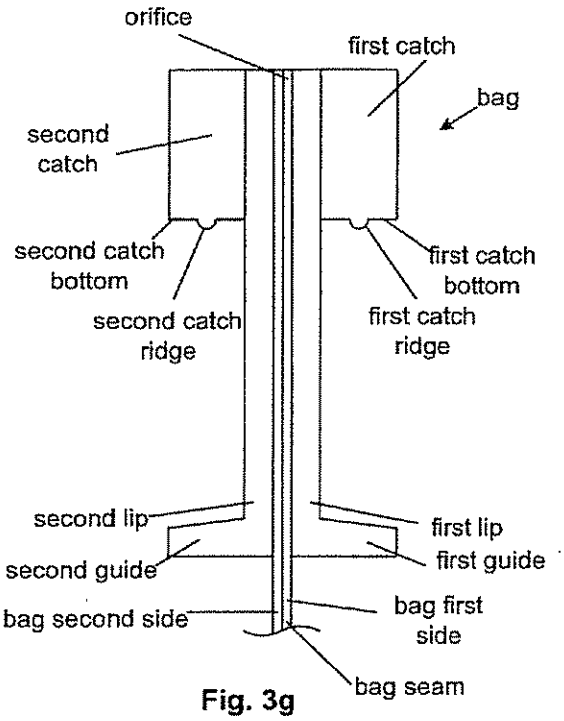

orifice
first catch
bag
second catch
second catch bottom
first catch bottom
second catch ridge
first catch ridge
second lip
first lip
second guide
first guide
bag second side
bag first side
bag seam

Fig. 3g

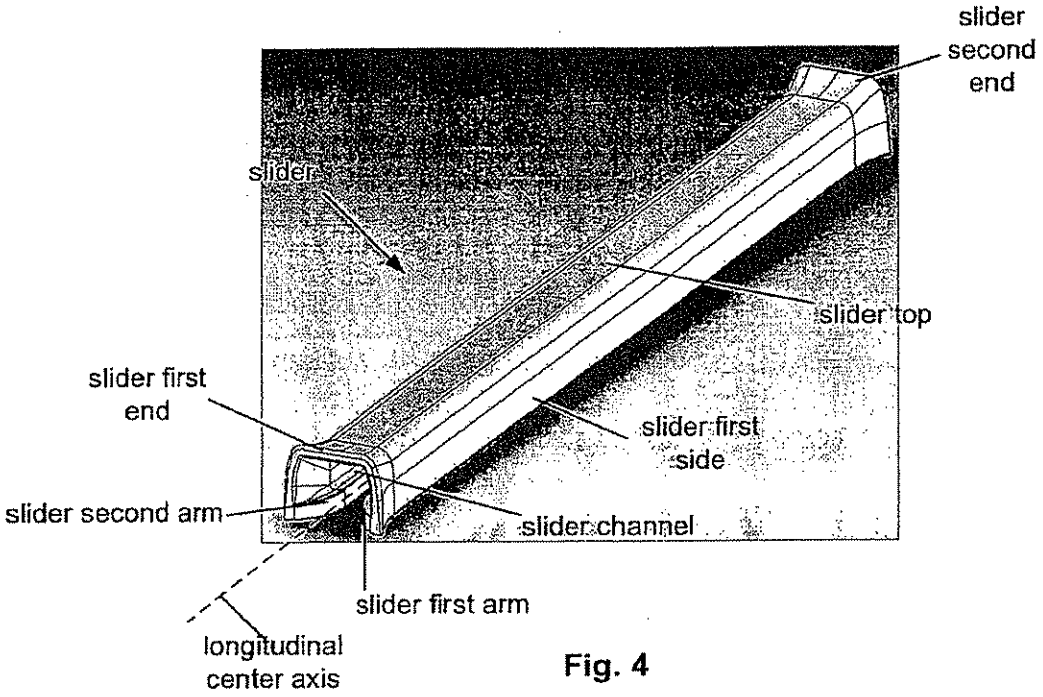

slider second end
slider
slider top
slider first end
slider first side
slider second arm
slider channel
slider first arm
longitudinal center axis

Fig. 4

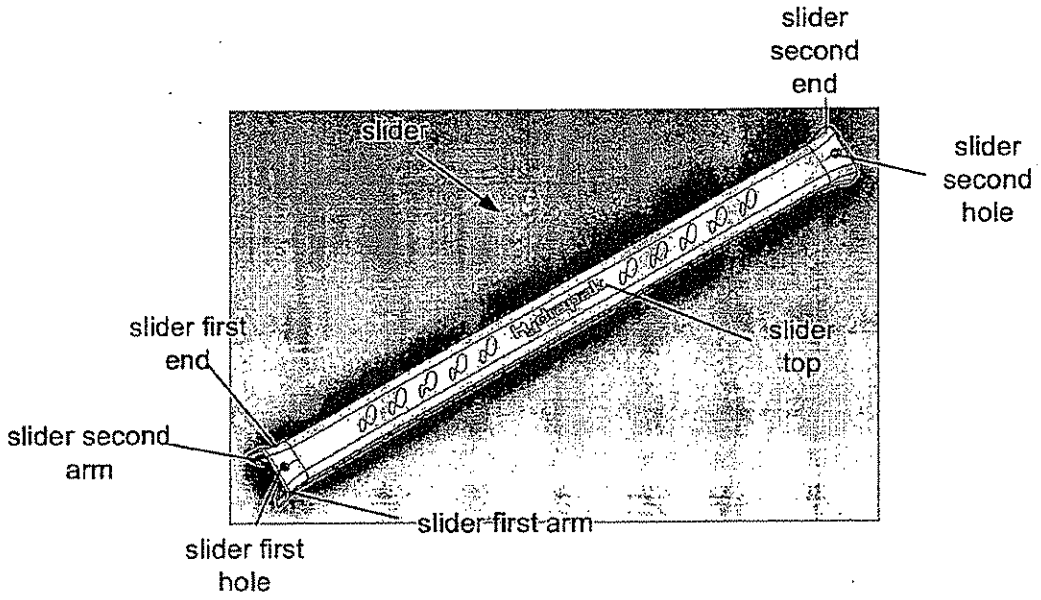

slider second end
slider
slider second hole
slider first end
slider top
slider second arm
slider first arm
slider first hole

Fig. 5

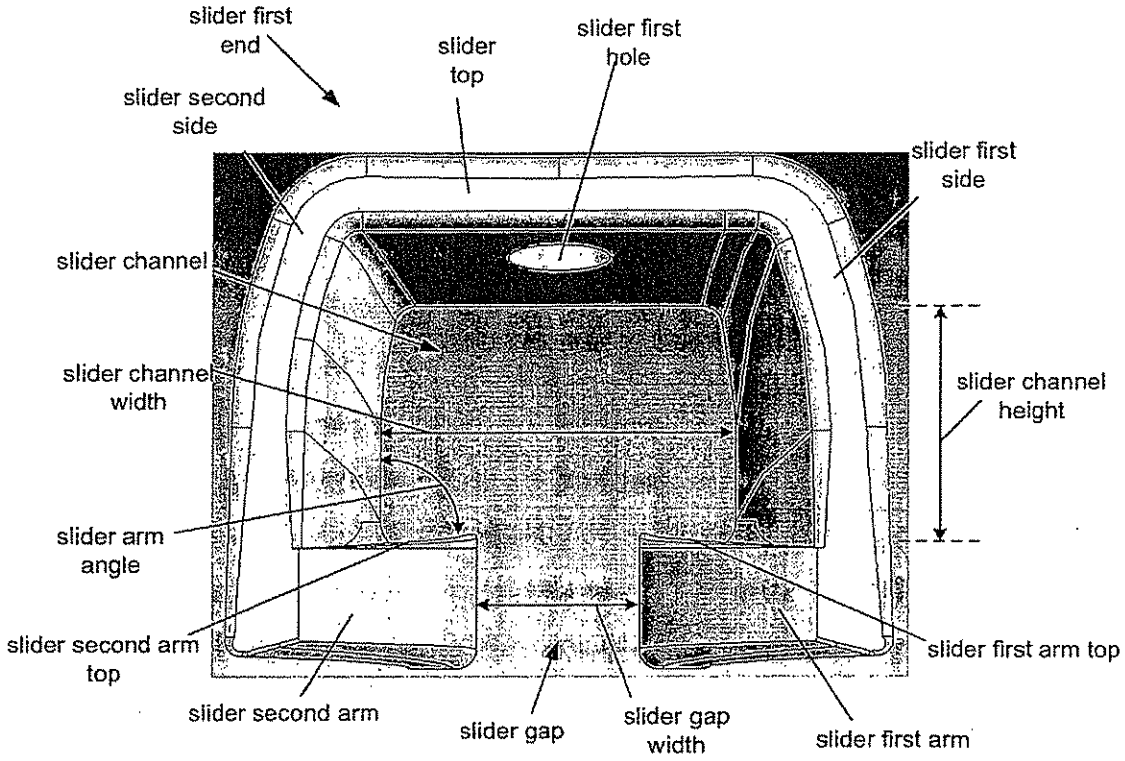

slider first end
slider top
slider first hole
slider second side
slider first side
slider channel
slider channel width
slider channel height
slider arm angle
slider second arm top
slider first arm top
slider second arm
slider gap
slider gap width
slider first arm

Fig. 6a

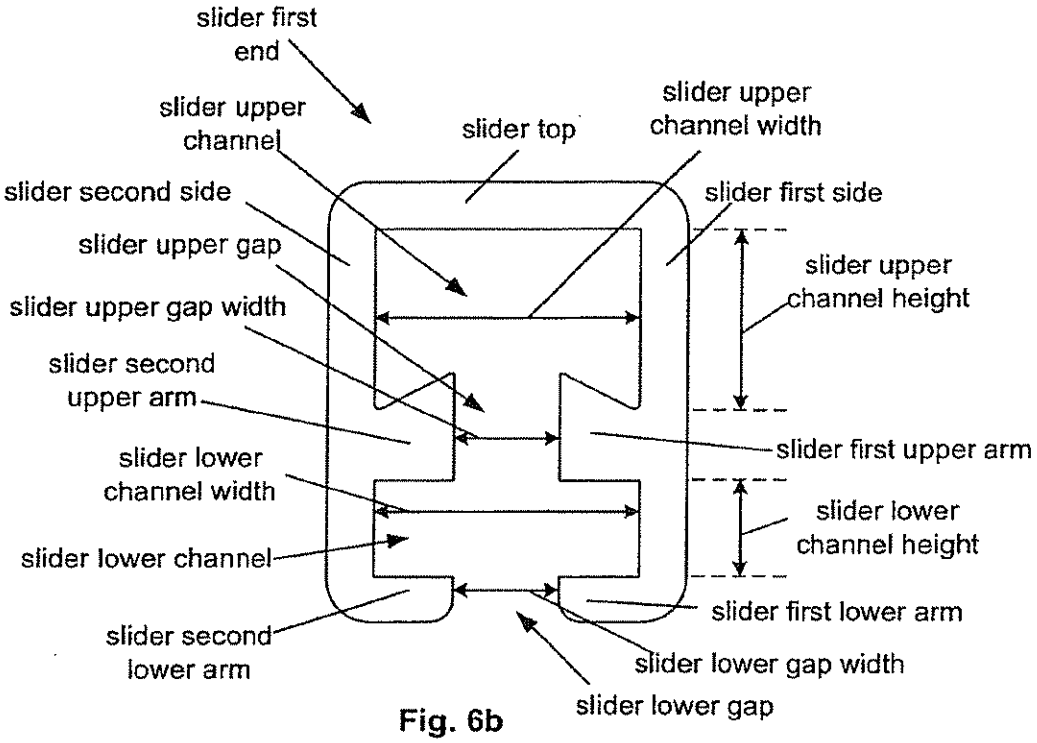

slider first end
slider upper channel
slider top
slider upper channel width
slider second side
slider first side
slider upper gap
slider upper channel height
slider upper gap width
slider second upper arm
slider first upper arm
slider lower channel width
slider lower channel height
slider lower channel
slider first lower arm
slider second lower arm
slider lower gap width
slider lower gap

Fig. 6b

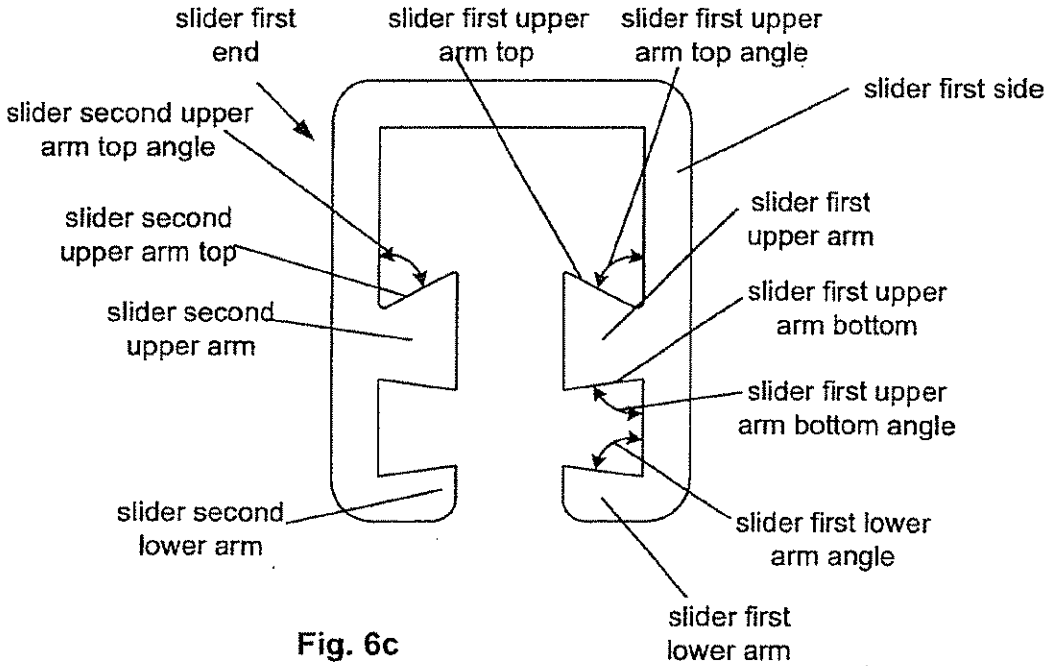

slider first end
slider first upper arm top
slider first upper arm top angle
slider first side
slider second upper arm top angle
slider first upper arm
slider second upper arm top
slider first upper arm bottom
slider second upper arm
slider first upper arm bottom angle
slider second lower arm
slider first lower arm angle
slider first lower arm

Fig. 6c

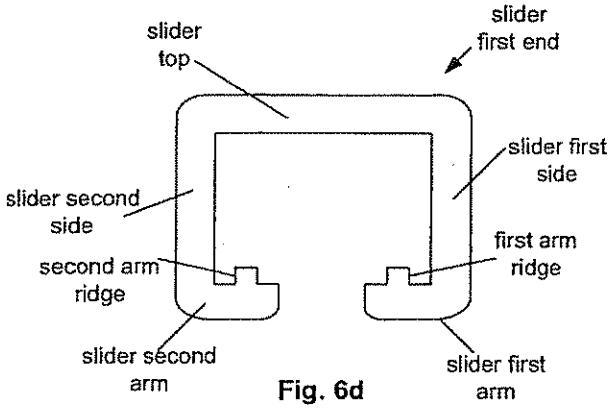


Fig. 6d

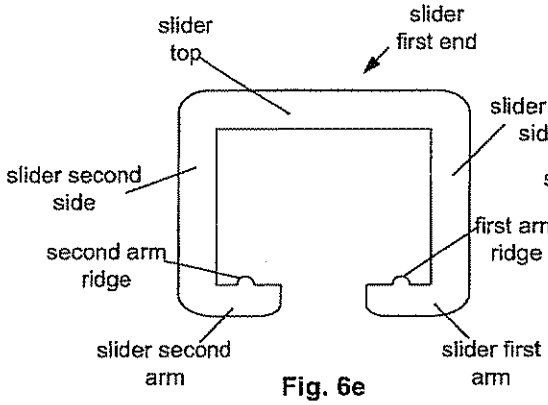


Fig. 6e

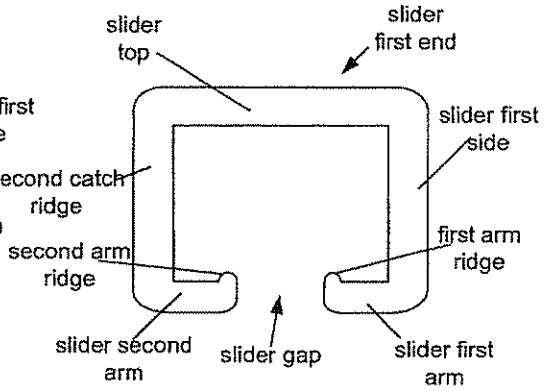


Fig. 6f

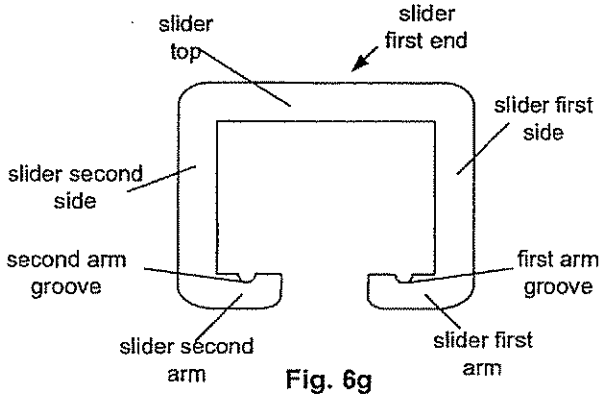


Fig. 6g

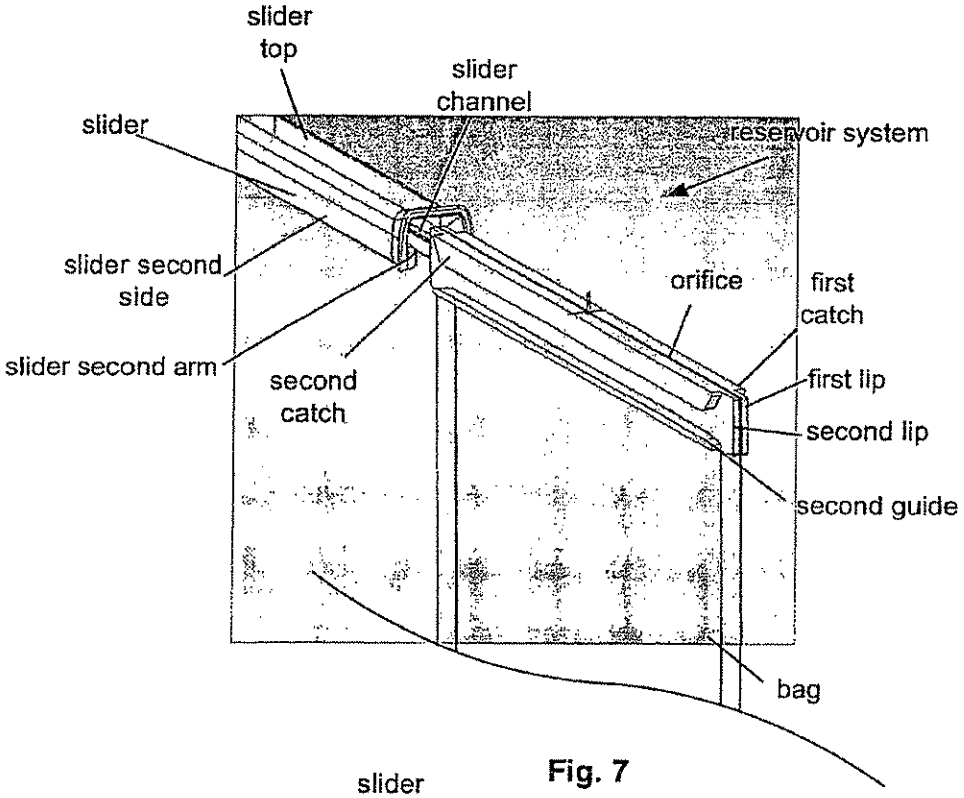

slider top
slider channel
slider
reservoir system
slider second side
orifice
first catch
slider second arm
second catch
first lip
second lip
second guide
bag

Fig. 7

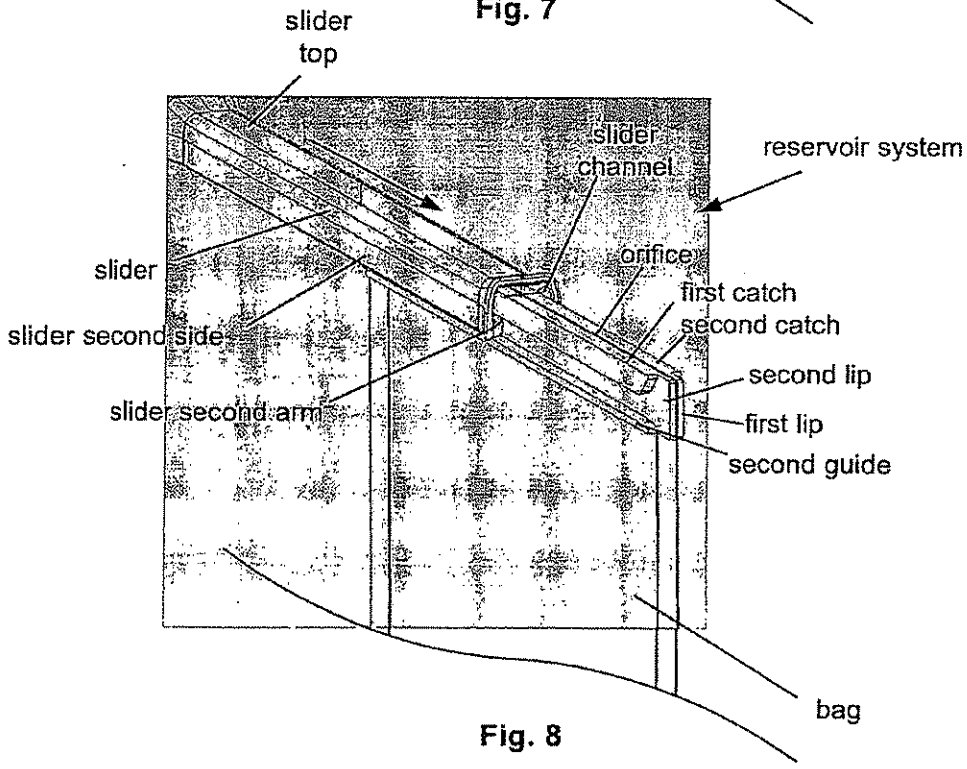

slider top
slider channel
reservoir system
slider
orifice
first catch
second catch
slider second side
second lip
slider second arm
first lip
second guide
bag

Fig. 8

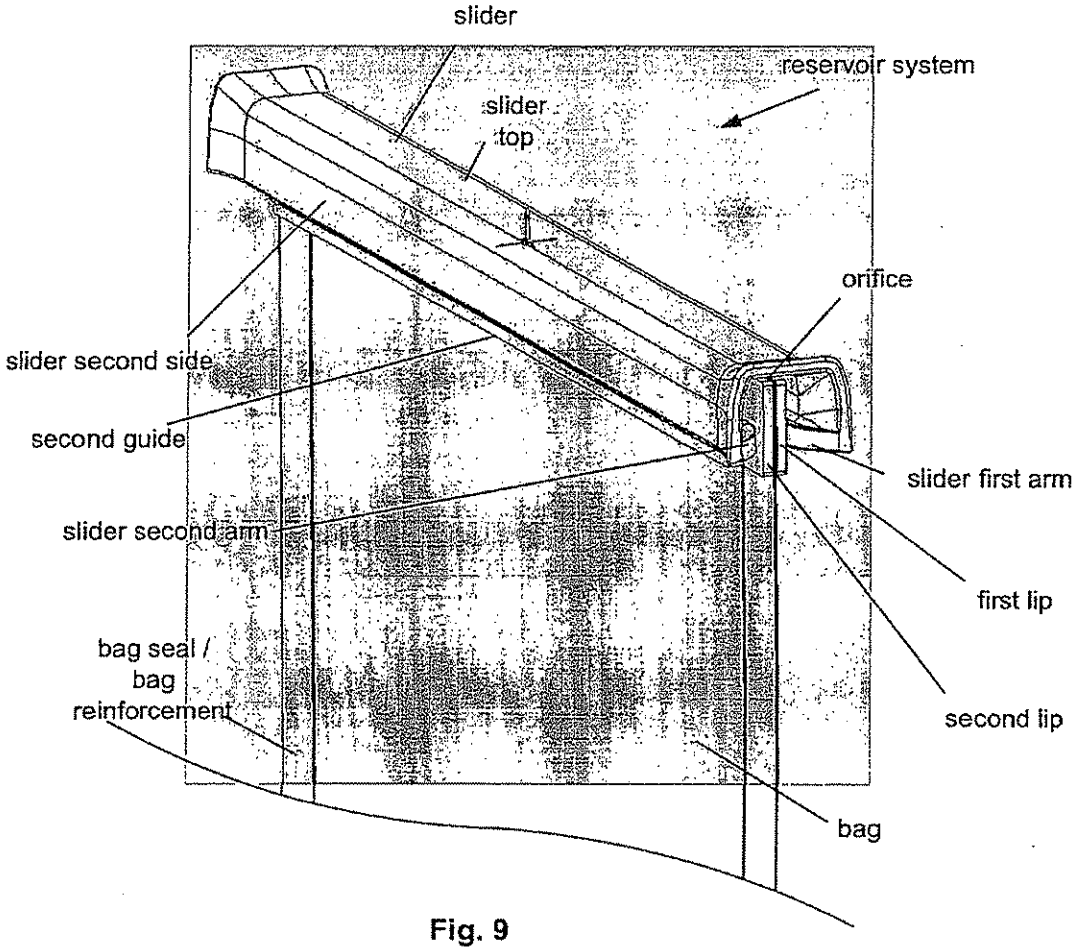

slider
reservoir system
slider top
orifice
slider second side
second guide
slider first arm
slider second arm
first lip
bag seal / bag reinforcement
second lip
bag

Fig. 9

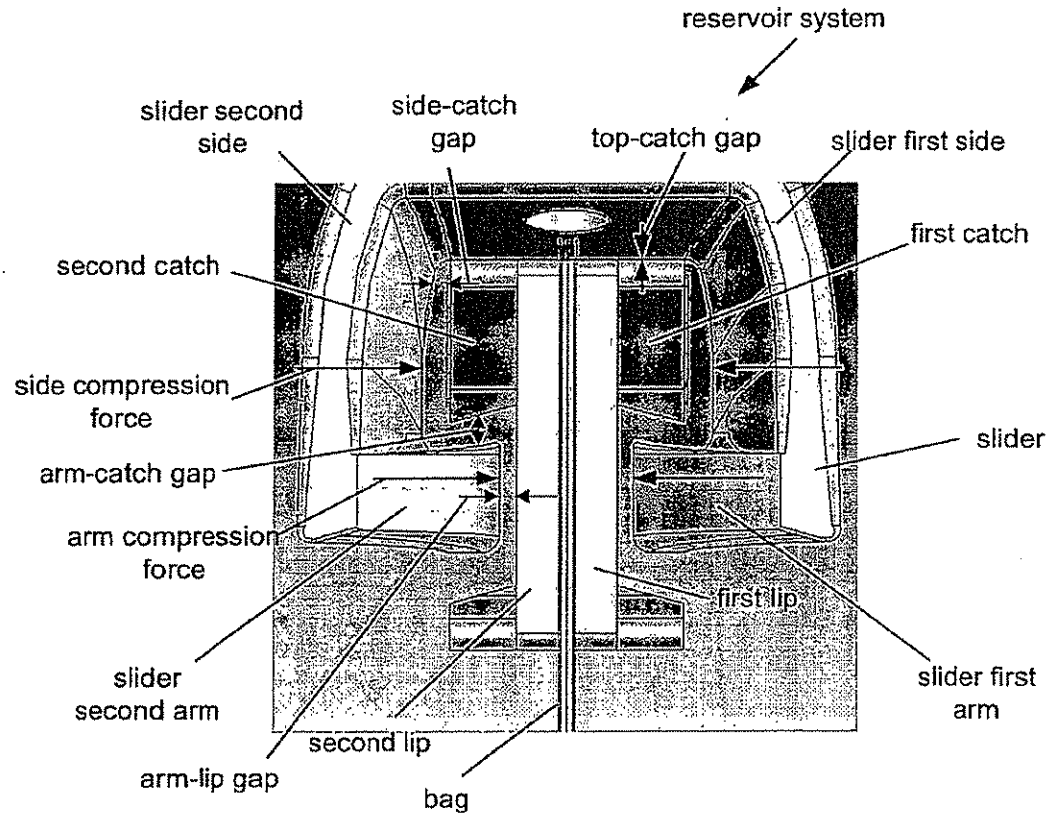

reservoir system
slider second side
side-catch gap
top-catch gap
slider first side
first catch
second catch
side compression force
slider
arm-catch gap
arm compression force
first lip
slider second arm
slider first arm
second lip
arm-lip gap
bag

Fig. 10a

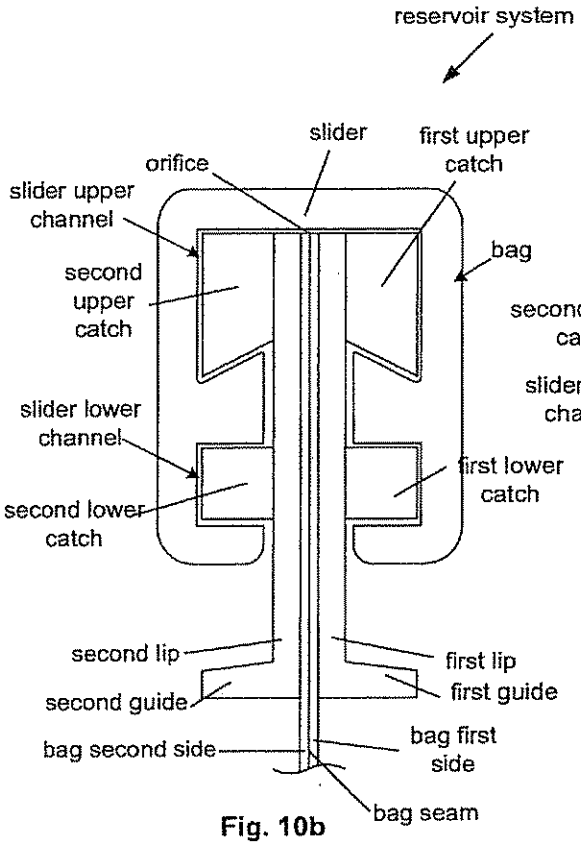


Fig. 10b

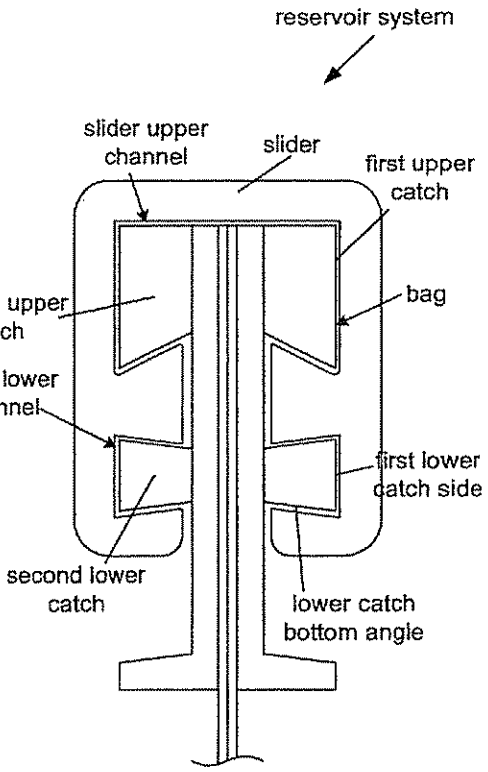


Fig. 10c

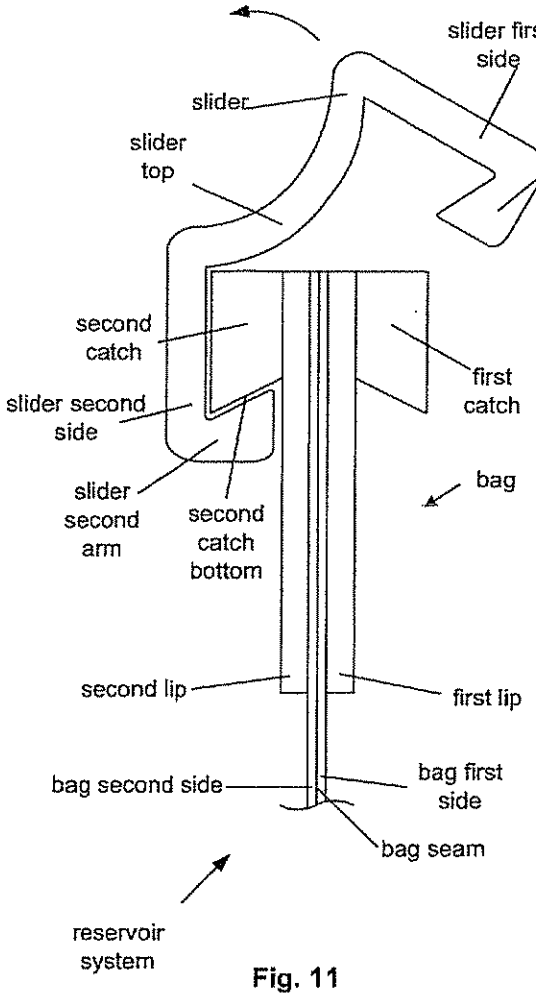

slider first side
slider
slider top
slider first arm
second catch
first catch
slider second side
bag
slider second arm
second catch bottom
second lip
first lip
bag second side
bag first side
bag seam
reservoir system

Fig. 11

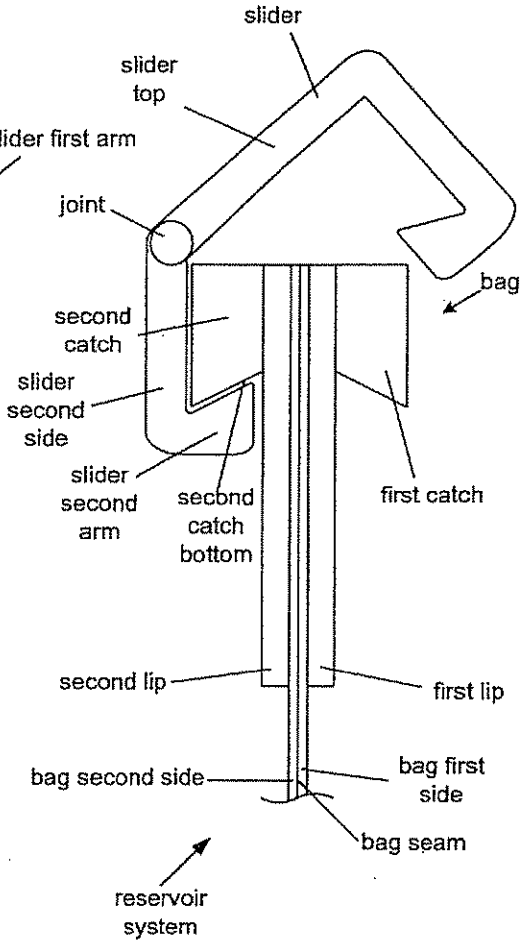

slider
slider top
joint
bag
second catch
slider second side
slider second arm
secbnd catch bottom
first catch
second lip
first lip
bag second side
bag first side
bag seam
reservoir system

Fig. 12

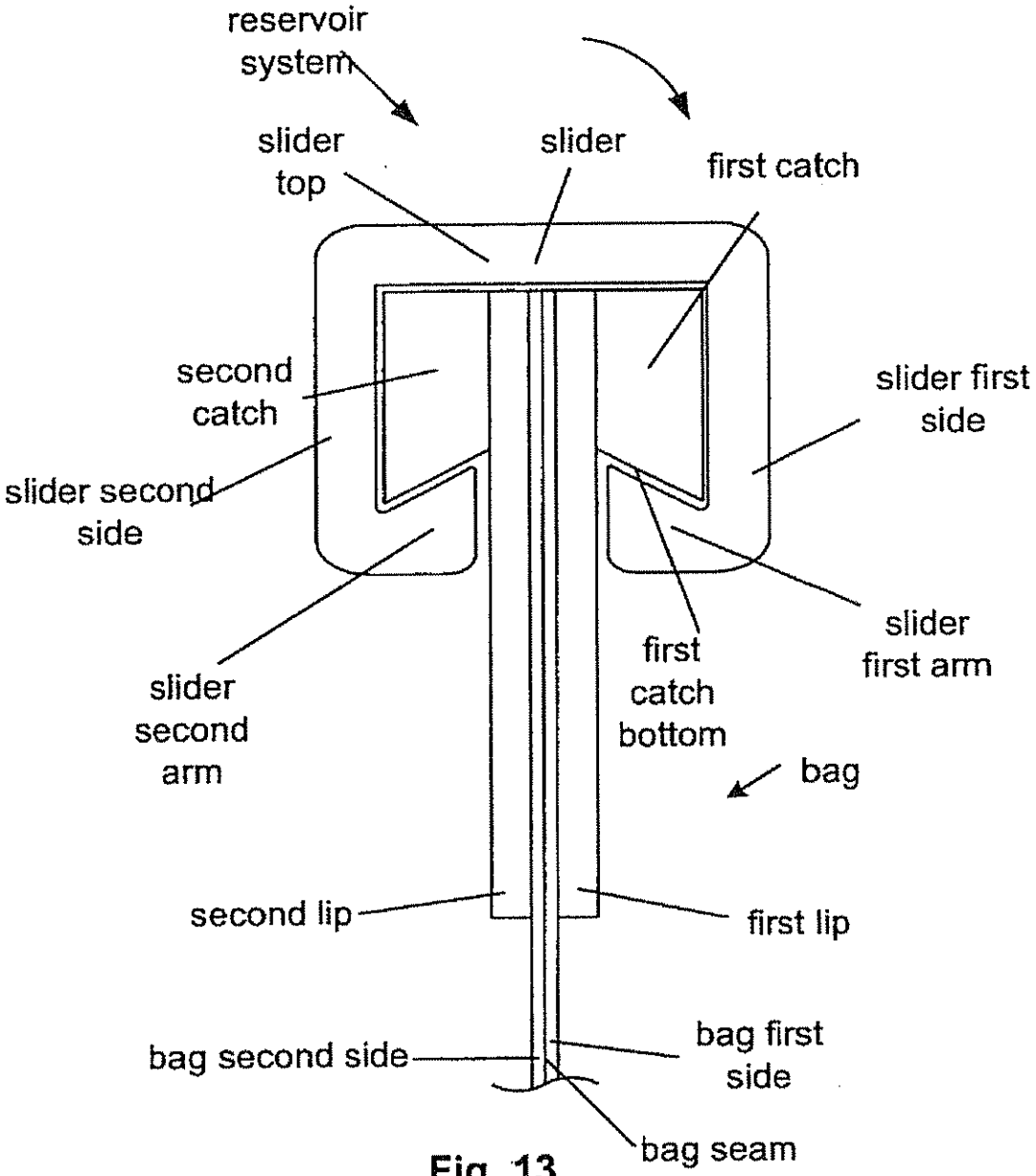

reservoir system
slider top
slider
first catch
second catch
slider first side
slider second side
slider first arm
slider second arm
first catch bottom
bag
second lip
first lip
bag second side
bag first side
bag seam

Fig. 13

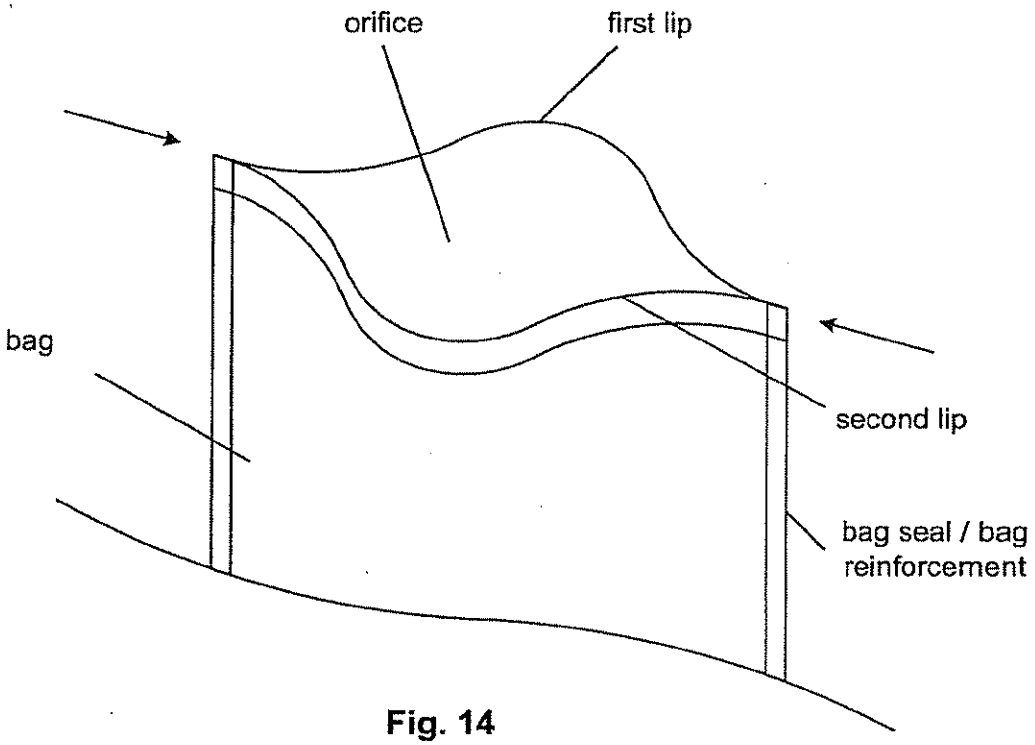

orifice
first lip
bag
second lip
bag seal / bag reinforcement

Fig. 14

RESERVOIR CLOSURE SYSTEM AND METHOD

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] This invention relates to the field of closeable and sealable fluid reservoirs. More specifically, this invention relates to reservoirs that can be closed and tightly and securely sealed, yet unsealed and opened rapidly.

[0003] 2. Description of the Related Art

[0004] Light weight, resealable bags are used increasingly in sporting activities, such as hiking, biking, and snow sport activities like skiing and snowboarding. Limited access to the interior of typical bags makes cleaning more difficult and increases the potential for unclean and unsanitary bags. Once liquids placed in the bags are consumed, the remaining deposits encourage the growth of bacteria and mold. If left uncleaned, such growths can leave stains on the bag, may retain odors, taint any other fluids subsequently introduced into the bag, and create health risks. Regular and thorough cleaning of the inside of the reservoir is critical.

[0005] Commonly used bags for sporting are typically accessible through a relatively small side port in the bag, often covered by a removable cap. The side port limits the access to the interior of the bag, thereby limiting the ability to clean the interior of the bag.

[0006] Also, removing or adding large quantities of liquid to the typical bags is often cumbersome and messy due to the limited and constrained access to reservoir via the side port. The side ports can also limit the flow rate into and/or out of the bag, slowing the process of removing excess fluid from the bag or loading fluid into the bag.

[0007] Zipper-type closures have been developed for bags in some uses. Zipper closures allow for larger and wider openings than typical side ports, thereby allowing easy cleaning of the interior of the bags. Zipper openings also ease the process of removing and adding fluid to the bag, in speed, convenience and cleanliness. However, common zipper closures are not suitable for most sporting activities. The bags often receive forceful blows during regular use, causing large increases in fluid pressure inside the bag. Elements used to close the opening often need to be reinforced to ensure closure during use. For example, the caps on side ports are often threaded. However, zippers are often only a small portion of the length of the entire opening, leaving much of the opening exposed to rupturing upon increased reservoir fluid pressure.

[0008] Roll-top closures satisfy the above demands: reinforced openings capable of withstanding high-pressure; ease of internal reservoir cleaning; and rapid, convenient, and clean liquid addition and removal. However, some users feel that roll-top closures are cumbersome and slow to open and close.

[0009] Therefore, a closeable reservoir system is desired that is capable of ease of internal reservoir cleaning. A closeable reservoir system is also desired that can provide rapid, convenient and clean liquid addition and removal. It is also desired to have a closeable reservoir system that can withstand significantly increased fluid pressures without leaking. A closeable reservoir system is also desired that is easy and fast to open and close.

BRIEF SUMMARY OF THE INVENTION

[0010] A reservoir closure system is disclosed. The system has a container, such as a bag, and a sealing member.

[0011] The container can have a reservoir and an orifice. The orifice can have closed and open configurations. The reservoir can be in fluid communication with the orifice. The orifice can have an orifice closed length when the orifice is in the closed configuration.

[0012] The sealing member can be configured to slidably attach to the container. The sealing member can have has a seal length. The seal length can be at least substantially equal to the orifice closed length. The sealing mechanism can be configured to seal the container. The sealing member can have a substantially straight configuration.

[0013] The container can have a first catch having a first catch bottom. The first catch bottom can have a first catch angle. The first catch angle can be less than about 90 degrees.

[0014] The sealing member can have one or more sealing member arms. The sealing member arms can be configured to attachably engage the catches of the container. The sealing member arms can have angled faces that correspond to angled faces on the catches. Any or all of the angles of the angled faces of the arms can be substantially equal to the angles of the angled faces of the corresponding angled faces of the catches.

[0015] The container can have a first end and a first side, and wherein the orifice is at the first end. The container can have an opening on the first side of the container. The reservoir system can have a cap removably attached to the opening. The cap can have a socket configured to attach to a tube.

[0016] The sealing member can be tethered to the container. The sealing member can be configured to be interference fit to the container.

BRIEF DESCRIPTION OF THE FIGURES

[0017] FIG. **1** illustrates an embodiment of the reservoir system.

[0018] FIG. **2** is a perspective view of an embodiment of the top of the bag.

[0019] FIGS. **3***a* through **3***g* are side views of various embodiments of the top of the bag.

[0020] FIG. **4** is a perspective view of an embodiment of the slider.

[0021] FIG. **5** is a top view of an embodiment of the slider.

[0022] FIGS. **6***a* through **6***g* are side views of various embodiments of the first end of the slider.

[0023] FIGS. **7** through **9** illustrate a sequence of an embodiment of a method of using the slider on the bag.

[0024] FIGS. **10***a*, **10***b* and **10***c* are side views of various embodiments of the top of the reservoir system.

[0025] FIGS. **11** and **12** illustrate various embodiments of methods of using the slider on the bag.

[0026] FIG. **13** illustrates an embodiment of the reservoir system with the slider attached to the bag.

[0027] FIG. **14** is a perspective view of an embodiment of a method of using the bag.

DETAILED DESCRIPTION

[0028] FIG. **1** illustrates that a reservoir system can have a reservoir container, such as a bag, and a sealing member, such as an elongated slider. The bag can have a reservoir, such as one or more hollows. Multiple reservoirs (not shown) in the bag can be divided into one or more separate compartments by one or more septa, bladders and/or other dividers.

[0029] The bag can have a bag reinforcement, such as a bag seal. The bag reinforcement can strengthen one or more higher-probability mechanical failure areas on the bag. The bag seal can have thicker dimensions than the surrounding material. The bag seal can have layers of the material of the bag or a different material attached to and/or integral with the bag. The bag seal can be along all or part (as shown) of the circumference of the bag, for example, excluding the portion of the bag adjacent to the orifice.

[0030] The slider and the bag can be configured to facilitate slidably translating the slider on the bag. The bag can have a guide. The guide can direct the slider during use.

[0031] The slider can have a slider seal configured to seal the orifice. The slider seal can be, for example, the location on the slider where the dimensions of slider arms provide sufficient force on the bag to seal the bag with the slider on the bag. The slider seal can have a slider seal length. The slider seal length can be from about 5 cm (2 in.) to about 91 cm (36 in.), more narrowly from about 5 cm (2 in.) to about 46 cm (18 in.), yet more narrowly from about 17 cm (6.5 in.) to about 18 cm (7.0 in.), for example, about 17 cm (6.5 in.).

[0032] FIG. **2** illustrates that the bag can have a first lip (partially hidden) and second lip, for example, adjacent to the orifice. The first lip can be opposite the second lip. The lips can be reinforced. The lips can be thicker and/or otherwise more reinforced and/or stronger than the surrounding bag material. The first lip can have one or more first engagement members, such as first catches. The second lip can have one or more second engagement members, such as second catches.

[0033] The bag can be made from a single sheet or from separate sheets, for example, integrated and/or attached at bag seams. The lips can have lip seams. The lip seams can be part of the bag seams. The seams can be leak-proof and water-tight.

[0034] The orifice can have an orifice length, for example in a closed configuration. The orifice length can be equal to or less than the slider seal length. The orifice length can be from about 3.8 cm (1.5 in.) to about 90.1 cm (35.8 in.), more narrowly from about 3.8 cm (1.5 in.) to about 45.2 cm (17.8 in.), yet more narrowly from about 15 cm (6.0 in.) to about 17 cm (6.8 in.), for example, about 15 cm (6.0 in.).

[0035] The bag can have an opening on either or both sides of the bag. A removable cap can cover the opening. The cap can be attached by an interference or screw interface, for example. The cap can be as disclosed by U.S. Patent Application Attorney Docket No. HYDRNZ00200 filed concurrently and herein incorporated by reference in its entirety.

[0036] The bag can have a fitment for sealably attaching to or otherwise interfacing with, for example, one or more valves, a nozzle interface, a tube interface, a nozzle, a tube (e.g., a straw), a plug, or combinations thereof. The fitment can be a socket. The fitment can be over the opening on either or both sides of the bag. The fitment can be the cap. The fitment can be or have a port or socket.

[0037] FIG. **3***a* illustrates that the bag can have a bag first side and a bag second side. The bag first side can be made from at least the same or a different sheet of material from the bag second side bag side.

[0038] The first and second catches can have first and second catch bottoms, respectively. The first and second catches can have first and second catch sides, respectively. The first and second catch sides can be substantially parallel with the lip seams, and/or the lips, and/or the bag seam, and/or the bag first side and/or second side. The angle formed by the catch bottom and the catch side can be a catch angle. The catch angle can be less than about 90°. The catch angle can be from about 0° to about 90°, more narrowly from about 30° to about 80°, yet more narrowly from about 45° to about 75°,for example, about 70°.

[0039] The catches can have a catch height. The catch height for the first catch can be the same as or different from the catch height of the second catch. The catch height can be from about 2 mm (0.08 in.) to about 100 mm (3.9 in.), more narrowly from about 2 mm (0.08 in.) to about 30 mm (1.2 in.) for example, about 5 mm (0.2 in.).

[0040] The distance from the first catch side to the side catch side can be a combined catch width. The combined catch width can be from about 1.5 *mm* (0.059 in.) to about 100 mm (3.94 in.), for example, about 7 mm (0.3 in.).

[0041] The first and second lips can have a combined lip width. The combined lip width can be from about 1.0 mm (0.039 in.) to about 100 mm (3.9 in.), for example, about 3 mm (0.1 in.).

[0042] FIGS. **3***b* and **3***c* illustrate that the lips can have a first upper catch (similar to the first catch described supra) and a second upper catch (similar to the second catch described supra). The lips can have a first lower catch and a second lower catch. The first (and second) lower catch can have a first (and second, respectively) lower catch top angle between the first (and second, respectively) lower catch top and the first (and second, respectively) lower catch side. The first (and second) lower catch can have a first (and second, respectively) lower catch bottom angle between the first (and second, respectively) lower catch side and the first (and second, respectively) lower catch bottom. The lower catch angles can be about 90°. The lower catch top angles can be equal or unequal to the lower catch bottom angles. The lower catch top and/or bottom angles can be less than about 90°, for example from about 0° to about 90°, more narrowly from about 30° to about 80°, more narrowly from about 45° to about 75°, for example about 75°.

[0043] FIG. **3***d* illustrates that the first and/or second catch bottoms can have one or more recessed interlockable elements, such as, respectively, first and/or second catch notches, recesses, slots, or grooves. The catch grooves can have substantially square or rectangular cross-sections. The catch grooves can be extend along all or part of the length of the catch bottoms. Although shown with a catch angle of 90°, the catch angle can be any catch angle disclosed herein.

[0044] FIG. **3***e* illustrates that the catch grooves can have substantially round (e.g., hemispherical, hemi-oval, otherwise partially spherical or oval) cross-sections. FIG. **3***f* illustrates that the first and second catch grooves can be immediately adjacent to the first and second lips, respectively.

[0045] FIG. **3***g* illustrates that the first and/or second catch bottoms can have one or more extending interlockable elements, such as, respectively, first and/or second catch

bumps, buttons or ridges. The catch ridges can have substantially inverted configurations of the configurations disclosed for the catch grooves.

[0046] FIG. **4** illustrates that the slider can have a substantially straight longitudinal center axis. The slider can have a slider first side and/or a slider second side and a slider top. The slider first side and/or a slider second side can extend substantially at a right angle or other non-zero angle from a slider top. The slider first arm can have a slider first arm. The first and second slider arms can extend substantially at a right angle or other non-zero angle from the first and second slider sides, respectively. The ends of the slider arms can taper.

[0047] The slider can have a first slider end and/or a second slider end. The slider ends can flare or otherwise expand radially away from the longitudinal center axis. The slider ends can include the ends of the slider sides, and/or the ends of the slider arms, and/or the ends of the slider top.

[0048] A hollow elongated slider channel can be defined by the slider top and/or the slider sides and/or the slider arms. The slider can be flexible or rigid. The slider can have one or more flexible first segments (e.g., the slider ends) and one or more rigid second segments (e.g., the remainder of the slider other than the ends).

[0049] FIG. **5** illustrates that the slider can have information thereon printed, embossed, otherwise marked, or combinations thereof. The information can be instructions or marketing information (e.g., branding) on the slider top and/or slider sides and/or slider arms.

[0050] The slider can have a slider first hole, for example at the slider first end. The slider can have a slider second hole, for example at the slider second end. The slider holes can be on the slider top.

[0051] FIG. **6***a* illustrates that the slider channel can have a slider channel width and a slider channel height. The slider channel width can be from about 2 mm (0.08 in.) larger than the combined catch width to about 130 mm (5 in.) larger than the combined catch width, more narrowly from about 2 mm (0.08 in.) larger than the combined catch width to 8 about 5 mm (0.2 in.) larger than the combined catch width, for example about 2 mm (0.08 in.) larger than the combined catch width. The slider channel height can be from about 2 mm (0.08 in.) larger than the catch height to about 130 mm (5 in.) larger than the catch height, for example about 2 mm (0.08 in.) larger than the catch height.

[0052] The slider can have a slider gap. The slider gap can be defined between the slider first arm and the slider second arm. The slider gap can have a slider gap width. The slider gap width can be the distance from the slider first arm to the slider second arm. The slider gap width can be from about 10 mm (0.4 in.) smaller than the combined lip width to about 10 mm (0.4 in.) larger than the combined lip width, more narrowly from about than the combined lip width to about 5 mm (0.2 in.) smaller than the combined lip width, yet more narrowly from about 1 mm (0.04 in.) smaller than the combined lip width to about 5 mm (0.2 in.) smaller than the combined lip width, for example about 5 mm (0.2 in.) smaller than the combined lip width.

[0053] The slider first and second arms can have slider first and second arm tops, respectively. The slider can have one or more slider arm angles. The slider arm angles can be the angle from the first slider arm top to the slider first side and/or from the second slider arm top to the slider second side. The slider arm angles can be the same or different on each side of the slider (i.e., on the slider first side and the slider second side). The slider arm angles can be in the same ranges and the example provided, supra, for the catch angle. The slider arm angles can be equal to the corresponding catch angles.

[0054] FIG. **6***b* illustrates that the slider can have upper arms (e.g., a slider first upper arm and a slider second upper arm) and lower arms (e.g., a slider first lower arm and a slider second lower arm). The slider can have a slider upper channel. The slider upper channel can be defined by the slider top, the slider first side, the slider second side, and the slider upper arms. The slider can have a slider lower channel. The slider lower channel can be defined by the slider first side, the slider second side, the slider upper arms, and the slider lower arms.

[0055] The slider upper channel can have a slider upper channel height and a slider upper channel width. The slider lower channel can have a slider lower channel height and a slider lower channel width.

[0056] The slider upper channel width and the slider lower channel width can be from about can be from about 10 mm (0.4 in.) smaller than the combined catch width to about 10 mm (0.4 in.) larger than the combined catch width, more narrowly from about than the combined catch width to about 5 mm (0.2 in.) smaller than the combined catch width, yet more narrowly from about 1 mm (0.04 in.) smaller than the combined catch width to about 5 mm (0.2 in.) smaller than the combined catch width, for example about 5 mm (0.2 in.) smaller than the combined catch width. The slider upper channel width can be the same as or different than the slider lower channel width.

[0057] The slider upper channel height and the slider lower channel-height can be from about 10 mm (0.4 in.) smaller than the upper or lower catch height to about 10 mm (0.4 in) larger than the upper or lower catch height, more narrowly from about 5 mm (0.2 in.) smaller than the upper or lower catch height to about 5 mm (0.2 in.) larger than the upper or lower catch height, for example about 2 mm (0.08 in.) larger than the upper or lower catch height. The slider upper channel height can be the same as or different than the slider lower channel height.

[0058] The slider can have a slider upper gap. The slider upper gap can be defined between the slider first upper arm and the slider second upper arm. The slider upper gap can have a slider upper gap width. The slider can have a slider lower gap. The slider lower gap can be defined between the slider first lower arm and the slider second lower arm. The slider lower gap can have a slider lower gap width.

[0059] The slider upper gap width and the slider lower gap width can be the distance from the slider first upper arm to the slider second upper arm. The slider upper gap width can be from be from about 10 mm (0.4 in.) smaller than the combined lip width to about 10 mm (0.4 in.) larger than the combined lip width, more narrowly from about than the combined lip width to about 5 mm (0.2 in.) smaller than the combined lip width, yet more narrowly from about 1 mm (0.04 in.) smaller than the combined lip width to about 5 mm (0.2 in.) smaller than the combined lip width, for example about 5 mm (0.2 in.) smaller than the combined lip width. The slider upper gap width can be the same as or different than the slider lower gap width.

[0060] FIG. **6***c* illustrates that the slider the slider upper and/or lower arms can have dovetail or other flared configurations. The slider first and second upper arms can have

slider first and second upper arm tops, respectively. Slider first and second upper arm top angles can be defined between the slider first and second upper arm tops, and the slider first and second sides, respectively (as shown).

[0061] The slider first and second arm top angles can be selected from the range or example provided herein for the upper catch angle. The slider first and second arm top angles can be greater than, less than, or equal to the upper catch angle.

[0062] The slider upper arms can have slider upper arm bottoms. Slider first and second upper arm bottom angles can be defined between the slider first and second upper arm bottoms, and the slider first and second sides, respectively (as shown).

[0063] The slider first and second arm bottom angles can be selected from the range or example provided herein for the lower catch top angle. The slider first and second arm bottom angles can be greater than, less than, or equal to the lower catch top angle.

[0064] Slider first and second lower arm top angles can be defined between the slider first and second lower arm tops, and the slider first and second sides, respectively (as shown). The slider first and second lower arm angles can be can be selected from the range or example provided herein for the lower catch bottom angle. The slider first and second lower arm angles can be greater than, less than, or equal to the lower catch bottom angle.

[0065] FIG. 6*d* illustrates that the slider first and/or second arms can have one or more extended interlockable elements, such as, respectively, first and/or second arm bumps, buttons or ridges. The arm ridges can have substantially square or rectangular cross-sections. The arm ridges can be extend along all or part of the length of the catch bottoms. Although shown with a catch angle of 90°, the catch angle can be any catch angle disclosed herein.

[0066] FIG. 6*e* illustrates that the arm ridges can have substantially round (e.g., hemispherical, hemi-oval, otherwise partially spherical or oval) cross-sections. FIG. 6*f* illustrates that the first and second arm ridges can be immediately adjacent to the slider gap.

[0067] FIG. 6*g* illustrates that the first and/or second slider arms can have one or more recessed interlockable elements, such as, respectively, first and/or second arm notches, recesses, slots, or grooves. The arm grooves can have substantially inverted configurations of the configurations disclosed for the arm ridges.

[0068] The catch grooves can be configured to interference fit with the arm ridges. The catch ridges can be configured to interference fit with the arm grooves.

[0069] The bag can be configured similar to and/or have any elements and/or configurations of the bag disclosed in U.S. Pat. No. 6,267,506, which is herein incorporated by reference in its entirety. If the top of the bag is rolled in a closed configuration, as shown in U.S. Pat. No. 6,267,506, the bag can be configured, when in the rolled configuration, to form substantially similar configurations to the first and/or second catches. The first and/or second catches can be formed by the splint(s) and/or fold(s) and/or flap(s) and/or other components disclosed in U.S. Pat. No. 6,267,506.

[0070] The bag, slider, and any and all other elements described herein can be made from polyethylene, such as high density polyethylene (HDPE) or low density polyethylene (LDPE) (e.g., linear LDPE), polytetrafluoroethylene (PTFE), polyurethane (e.g., thermoplastic polyurethane (TPU)), polyvinyl chloride (PVC), thermoplastic elastomer (TPE), polyoxymethylene (POM), also known as acetal resin, polytrioxane and polyformaldehyde (e.g., Dehin by E.I. du Pont de Nemours and Company, Wilmington, Del.), Nylon, or combinations thereof. For example, the slider can be made from POM and the bag can be made from TPU.

Method of Making

[0071] The bag can be molded and/or any and/or all of the elements of the bag can be welded (e.g., RF welded) together. The slider can be molded and/or any and/or all of the elements of the slider can be welded (e.g., RF welded) together

Methods of Use

[0072] FIG. 7 illustrates that before sealably closing the orifice, the slider can be unattached to the bag. The slider can be aligned to the top of the bag. The slider channel can be substantially longitudinally aligned with the first and second catches.

[0073] FIG. 8 illustrates that the slider can be translated relative to the bag, as shown by arrow. The slider can be slidably attached to the bag. The slider can be translated in the direction of the longitudinal center axis. The guides, lips, and catches can direct the slider arms longitudinally along the top of the bag. The tapered configuration of the slider arms can direct the slider arms longitudinally along the top of the bag. The slider arms can force the first lip toward the second lip. The slider sides can force the first catch toward the second catch.

[0074] The slider can be unattached from the bag by translating the slider in the direction relative to the bag opposite that shown by the arrow in FIG. 8.

[0075] FIG. 9 illustrates that the reservoir system can be in a sealed configuration. The slider can be slidably attached and friction fit to the top of the bag. The slider can provide pressure squeezing the orifice closed.

[0076] FIG. 10*a* illustrates that when the slider is attached to the top of the bag, the slider can sealably close the orifice. The slider can apply pressure on the bag at any combination of the following areas: where the slider top contacts the lips and/or the catch; where the catches contact the slider sides; where the slider arms contact the catches, where the slider arms contact the lips, and where the arms contact the guides.

[0077] The reservoir system can have side-catch gaps between the slider sides can the corresponding catches. The reservoir system can have a top-catch gap between the slider top and the catches and/or lips. The reservoir system can have arm-catch gaps between the slider arms and the corresponding catches. The reservoir system can have arm-lip gaps between the slider arms and the corresponding lips. With the slider deployed to sealably close the bag, the side-catch gaps, top-catch gap, arm-catch gaps, and arm-lip gaps can be from about 0 mm (0 in.) to about 10 mm (0.4 in.), for example about 0 mm (0 in.).

[0078] The slider arms can produce an arm compression force, shown by arrows, against the first and second lips. The slider sides can produce a side compression force, shown by arrows, against the first and second catches. The arm and/or side compression forces can minimize and/or prevent fluid leakage from the reservoir out of the orifice.

[0079] When pressure in the bag increases (e.g., when the bag contains fluid and the bag is squeezed), the first and/or

second catches can impair the movement of the slider first and/or second arms, respectively, in. an upward direction (with respect to the page of FIG. **10***a*), for example retaining the slider on the bag.

[0080] FIG. **10***b* illustrates that the slider of FIG. **6***b* is configured to sealably close the bag of FIG. **3***b*. The upper catches can be configured to engage and slidably attach to the slider upper channel. The lower catches can be configured to engage and slidably attach to the slider lower channel. FIG. **10***c* illustrates that the slider of FIG. **6***cis* configured to sealably close the bag of FIG. **3***c*.

[0081] The slider gaps, slider upper gaps and slider lower gaps can be configured to engage and slidably attach to the lips.

[0082] The bags illustrated in FIGS. **3***d* through **3***g* can be used with sliders illustrated in FIGS. **6***d* through **6***g*, respectively. During use, the catch grooves can interference fit with the arm ridges. During use, the catch ridges can interference fit with the arm grooves.

[0083] FIG. **11** illustrates that the slider top can be resiliently or deformably bendable. The slider top can be rotatably bent, as shown by arrow. The slider second arm can be fixedly attached and/or engaged to the second catch bottom. The slider second side can be positioned directly adjacent to the second catch. The slider first side and slider first arm can be unattached to and/or disengaged from the first catch.

[0084] FIG. **12** illustrates that the slider can have one or more rotatable elements, for example hinges orjoints. The joint can be at the intersection of the slider top and the slider first and/or second side. The joint can enable the slider top to rotate with respect to the slider first and/or second side. The joint can be fixable (e.g., lockable), for example when the slider top is at a right angle with respect to the slider first and/or second side. The joint can be passive and/or biased to force the slider top to a right angle with. respect to the slider first and/or second side.

[0085] FIG. **13** illustrates that the slider of FIGS. **11** and **12** can be released and/or forcibly rotated, as shown by arrow. The slider first arm can snap onto the first catch, fixedly attaching to the first catch bottom and/or producing the arm compression force. The slider first side can be directly adjacent to the first catch and/or producing the side compression force.

[0086] FIG. **14** illustrates that the orifice can be opened when the slider is not engaged to seal the orifice. Compressive forces, as shown by arrows, can be applied to the ends of the lips. Tensile forces, not shown (but perpendicular to the shown compressive forces), can be applied to the sides of the lips. The first lip can separate from the second lip. The lips can open in a puckered configuration. During use, solids and/or fluids (e.g., potable water, other beverages) can be transferred into and/or out of the bag from the open orifice. The flexible bag can be turned inside out through the orifice, for example, to aid access and cleaning the inside of the bag. The lips can be configured to be resiliently biased to close.

[0087] The slider can be attached to the bag. For example, a leash can attach the slider to the bag. The leash can be attached to the first and/or second hole. Also for example, the slider and/or bag can have a catch configured so the slider can not be completely slidably removed from the bag.

[0088] It is apparent to one skilled in the art that various changes and modifications can be made to this disclosure, and equivalents employed, without departing from the spirit and scope of the invention. Elements of systems, devices and methods shown with any embodiment are exemplary for the specific embodiment and can be used in combination or otherwise on other embodiments within this disclosure.

We claim:

1. A reservoir closure system comprising:

a container having a reservoir and an orifice having a closed configuration, wherein the reservoir is in fluid communication with the orifice, and wherein the orifice has an orifice closed length when the orifice is in the closed configuration;

a sealing member configured to slidably attach to the container, and wherein the sealing member has a seal length, and wherein the seal length is at least substantially equal to the orifice closed length, and wherein the sealing mechanism is configured to seal the container, and wherein the sealing member has a substantially straight configuration.

2. The system of claim **1**, wherein the container comprises a first catch having a first catch bottom, and wherein the first catch bottom has a first catch angle, and wherein the first catch angle is less than about 90 degrees.

3. The system of claim **2**, wherein the sealing member has a first side and a first arm, wherein a first arm angle is defined between the first side and the first arm.

4. The system of claim **3**, wherein the first catch angle is substantially equal to the first arm angle.

5. The system of claim **4**, wherein the first catch angle is less than about 90°.

6. The system of claim **3**, wherein the container has a first end and a first side, and wherein the orifice is at the first end.

7. The system of claim **6**, wherein the container has an opening on the first side of the container.

8. The system of claim **6**, further comprising a cap removably attached to the opening.

9. The system of claim **8**, wherein the cap has a socket configured to attach to a tube.

10. The system of claim **3**, further comprising a tether attached to the slider and the container.

11. The system of claim **3**, wherein the sealing member is configured to be interference fit to the container.

12. The system of claim **1**, wherein the container comprises a first catch having a first catch bottom, and wherein the first catch bottom comprises a first catch ridge.

13. The system of claim **12**, wherein the sealing member comprises a first arm comprising a first arm groove configured to interference fit the first catch ridge.

14. The system of claim **1**, wherein the container comprises a first catch having a first catch bottom, and wherein the first catch bottom comprises a first catch groove.

15. The system of claim **14**, wherein the sealing member comprises a first arm comprising a first arm ridge configured to interference fit the first catch groove.

16. The system of claim **1**, wherein the container comprises a polyurethane.

17. The system of claim **16**, wherein the polyurethane comprises TPU.

18. The system of claim **16**, wherein the container substantially completely comprises a polyurethane.

19. The system of claim **18**, wherein the polyurethane comprises TPU.

20. A reservoir closure system comprising:

a container having a reservoir and an orifice, wherein the reservoir is in fluid communication with the orifice;

a sealing member configured to slidably attach to the container;

wherein the container comprises a polyurethane.

21. The system of claim **20**, wherein the polyurethane comprises TPU.

22. The system of claim **20**, wherein the container substantially completely comprises a polyurethane.

23. The system of claim **22**, wherein the polyurethane comprises TPU.

24. The system of Claim. **20**, wherein the container has a first side, and wherein the container has an opening on the first side of the container.

25. The system of claim **24**, further comprising a cap removably attached to the opening.

26. A reservoir closure system comprising

a first bag wall, a second bag wall and an orifice

a first catch on the first bag wall, wherein the first catch faces away from the orifice;

a second catch on the second bag wall, wherein the second catch faces away from the orifice

27. The system of claim **27**, comprising no catches on the orifice-side of the bag walls

28. A method of closing a reservoir system comprising a sealing member and a container comprising a first wall and a second wall, an orifice having a closed orifice length in a closed configuration, and a first catch extending from the first wall, wherein the first catch has a first catch bottom, the method comprising:

pressing the first wall and the second wall together along the entire closed orifice length with the sealing member; and

securing the sealing member to the container; wherein securing comprises attaching the sealing member to the first catch bottom.

29. The method of claim **28**, wherein pressing comprises sliding the sealing member onto the container.

30. The method of claim **28**, wherein pressing comprises rotating the sealing member onto the container.

* * * * *